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ABSTRACT

This final report describes the accomplishments of a 2-year study designed to adapt and standardize the Eighth Edition of the Stanford Achievement Test (SAT-8) with a national, randomly drawn sample of 6,932 students (ages 7-20) with deafness and partial hearing. The project also assessed changes in achievement levels of students with deafness and partial hearing over the last 15 years, through analyses and comparisons of the 1974, 1983, and 1990 Stanford norming databases. The accomplishments of the project are described, including the preparation of materials and selection of the norming sample; the test administration, scoring, and reporting; the development of norms; and the analysis and dissemination of the project's data. Appendices--making up over 90% of the report--include the screening test materials; the draft of the technical manual; the SAT-8 supplemental administration manual; score interpretation materials; the hearing impaired norms booklet; and drafts of works in progress (including demographic and school program correlates of SAT-8 results with students with deafness and partial hearing, demographic and achievement changes from 1974 to 1990, and an item analysis of the SAT-8 with students with deafness and partial hearing.) (CR)

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FINAL REPORT

Adaptation, Standardization, and Analysis of the New 8th Edition Stanford Achievement Test with Hearing Impaired Students

by

Center for Assessment and Demographic Studies
Gallaudet Research Institute
Gallaudet University
Washington, DC 20002-3625

to

Special Education Programs
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Washington, DC 20202

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Adaptation, Standardization, and Analysis of the New 8th Edition Stanford Achievement Test with Hearing Impaired Students

1. Abstract

This Final Report describes the accomplishments of a 2-year study designed to adapt and standardize the 8th Edition of the Stanford Achievement Test (SAT-8) with a national, randomly drawn sample of deaf and hard of hearing students. This project was carried out by Gallaudet Research Institute's Center for Assessment and Demographic Studies.

The following objectives, described in our original proposal (November, 1989) and in our continuation proposal (March, 1990) have been accomplished.

1. Screening materials have been developed and are being disseminated.
2. Special administration procedures have been developed and are being disseminated.
3. The SAT-8 was administered to 6,932 students with the use of the screening materials and special administration procedures.
4. Age-based percentile rank norms for deaf and hard of hearing students have been computed.
5. Computerized test score programs have been developed which prepare individual students reports, including the norms for deaf and hard of hearing students.
6. Computerized data files, including achievement, demographic, and handicapping information have been statistically analyzed. Drafts of papers describing the results of this analysis have been prepared. This analysis is continuing.
7. A technical manual containing a description of the norming sample, reliability and validity information, and decile norms for selected population subgroups has been produced and is being disseminated.
8. Eleven national and regional workshops were carried out instructing teachers on the administration and interpretation of the SAT-8 when used with deaf and hard of hearing students.
9. The data base has been further examined in four separate sets of analyses.

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Overview

The goals of this project were to:

1) adapt the administration procedures and compute special norms for deaf and hard of hearing students for the Stanford Achievement Test, 8th Edition (SAT-8), and determine its reliability for this population;

2) assess the changes in achievement levels of deaf and hard of hearing students over the last 15 years through analyses and comparisons of the 1974, 1983, and 1990 Stanford norming data bases.

The two-year project was conducted in four major phases. The activities are summarized in the following list.

Phase 1: Preparation of materials and selection of the norming sample

A. Prepare screening tests.

B. Develop screening test directions.

C. Develop scoring rules for assigning students to a test level based on screening test results.

D. Select deaf and hard of hearing students to be included in the norming sample.

E. Contact programs to ascertain participation in the project; select sample replacements as necessary.

F. Obtain SAT-8 testing materials from the Psychological Corporation.

G. Prepare a manual for administering SAT-8 to deaf and hard of hearing students.

Phase 2: Test administration, scoring, and reporting

A. Administer the screening tests to the norming sample.

B. Develop programs and materials for score reports.

C. Administer SAT-8 tests to the norming sample.

D. Collect completed tests and prepare them for machine scoring at the publisher's scoring center in San Antonio.

E. Prepare score reports and distribute results to programs.

F. Build data files.

Phase 3: Norms development

A. Merge test data with Annual Survey and longitudinal data.

B. Compute age-based percentile ranks for deaf and hard of hearing students and compile norms tables.

Phase 4: Analysis and dissemination

A. Analyze demographic and school placement correlates and effects of P.L. 94-142 on test results.

B. Compare 1990 SAT-8 results with 1974 and 1983 Stanford normings.

C. Compile special subgroup norms.

D. Perform reliability assessment and item analysis.

E. Conduct regional workshops.

F. Evaluate effectiveness of the norming project.

Accomplishments

All of the objectives described in our proposal have been met, and all activities described above are complete. The first year of the project consisted of activities related to test administration. This included the development of screening procedures and materials, administration of the screening tests, development of programming and materials for reporting test results, administration and scoring of the SAT-8, reporting SAT-8 results, and building data files in preparation for the second year of the project. The second year consisted of activities related to analysis and dissemination. These activities included compiling norms, analyzing the data base in relation to other longitudinal data, conducting regional workshops, and preparing this final report.

Each activity undertaken during the project is described below.

Phase 1: Preparation of materials and selection of the norming sample

A. A set of 16 screening tests for use with deaf and hard of hearing students were created and pilot tested. These screening tests consist of 8 reading tests and 8 mathematics tests, corresponding to the 8 levels of the SAT-8. Samples of these tests are included in Appendix A.

Screening test items were selected from the item bank created by the Psychological Corporation during their SAT-8 item field test phase. Each item was accompanied by a description of the instructional objective for which it was written and by a listing of its field test statistics. Mathematics computation items were selected for screening into mathematics computation and concepts of numbers subtests, and reading comprehension items were selected for screening into all other subtests.

For the pilot testing, more items were included in the screening tests than was anticipated would be included in the final screening instruments. The pilot test data were analyzed in terms of specific item characteristics, as well as for characteristics of each screening test as a whole. The focus of the analysis was alignment of the screening tests with the corresponding SAT-8 subtests. Individual items were analyzed using both traditional item statistics and Rasch analysis. Each item was evaluated for its difficulty level, discrimination ability, and fit to the test. Items that were extremely easy or difficult, that did not discriminate or discriminated negatively, or that did not provide a satisfactory fit to the test were eliminated. After each item deletion, a new Rasch analysis was performed to verify that the deletion improved the test as a whole. Upon the completion of this process, the screening tests contained 10-12 items each.

B. Two additional documents were prepared concurrently with the screening tests. One document contains directions for screening test administration. The second contains listings of the reading and mathematics instructional objectives and summaries of their association with the SAT-8 screening test items. Samples of these documents are included in Appendix A.

C. A system for scoring the screening tests and assigning the appropriate SAT-8 levels was developed and printed in the form of scoring packets. This scoring system is based on the observed alignment of the screening tests with the corresponding SAT-8 subtests. In general, placement on the SAT-8 is determined by the raw score on the screening test. Special directions are given, however, for the situation in which a student scores 90% or higher or scores in the guessing range. A sample scoring packet is included in Appendix A. With this simplified scoring system programs can complete their own scoring with minimal time and effort.

D. A norming sample was selected, using CADS' Annual Survey of Hearing Impaired Children and Youth as a sampling base. The Annual Survey is representative of the population of deaf and hard of hearing students in the United States who are receiving special education services. Sampling consideration was given only to the subset of deaf and hard of hearing students for whom this norm-referenced achievement test is likely to be appropriate. Students who were less than 7 or more than 20 years of age were excluded from consideration, as were those students who were listed as having mental retardation. Thus, the resulting target population and its representative sample were composed of students aged 7-20 without reported mental retardation.

Testing was scheduled for spring 1990 for students in the 1989-1990 Annual Survey. However, the 1989-1990 Annual Survey data base was not available at the time sampling was completed in fall 1989. It was necessary to use the data available in the 1988-1989 data base to determine the appropriate proportions for the sample. As expected, there was only a slight shift in the population between the 1988-1989 Annual Survey (which was sampled) and the 1989-1990 Annual Survey (which was tested).

The sampling base was divided into 8 strata based on the four Bureau of the Census regions of the U.S. (Northeast, Midwest, South, West) and 2 type-of-program categories (special schools for deaf and hard of hearing students, local special educational programs). Due to financial and practical considerations, programs (not students) were drawn from the strata.

In addition to region and program type, two other factors were considered in the sampling design. Programs that participated in the pilot testing were automatically included in the norming sample. In addition, CADS had normed the 7th Edition of the Stanford in 1983 for use with deaf and hard of hearing students. Prior to the norming of this 8th Edition, it was determined that approximately 1000 of the students who were tested in 1983 were still present in the 1988-1989 Annual Survey data base. As many of those programs as possible were included in the sample. In addition, in spring 1989 CADS conducted a pilot test for screening procedures to be used with the new 8th Edition.

It was determined that a minimum sample of approximately 6,300 students would be required to achieve a 3% margin of error with a 95% confidence level for a proportional variable from a finite population where the population proportion was assumed to be .50. However, it had been anticipated that some of the programs sampled would decline the invitation to participate. A total of 135 programs representing more than 12,000 students were sampled to insure that the final number would be adequate to represent the target population in each of the strata. The demographic, audiological, and program characteristics of these 135 programs were compared with those of the entire 1988-89 Annual Survey to verify that the sample was representative of the population.

Appendix B contains a draft of a technical manual produced in this project. Section 1 of this manual contains a detailed description of the sampling procedure. Table 1.1 in the manual shows the four Bureau of the Census regions used to stratify the sample and indicates the states included in each. Table 1.2 contains a listing of the different types of programs that supply data to the Annual Survey and the sampling categories to which they correspond. As shown in that table, several program types enrolling special groups of students for whom the Stanford is not likely to be appropriate were omitted from the sampling scheme.

E. When the 135 sampled programs were invited to participate in the project, a total of 107 accepted. Those 107 programs contained approximately 10,000 students and were representative of the Annual Survey in terms of demographic and other characteristics. In addition, analysis showed that the number in each of the 8 strata was sufficient to allow variable estimation within a 3% error rate with a 95% confidence interval. Therefore, it was decided that sample replacement would not be necessary for those programs that declined to participate.

Table 1.3 of the technical manual (Appendix B) shows the distribution of the sampled programs among the 8 strata. It also presents the number of programs and the number and proportion of the target population in each of the strata.

F. SAT-8 testing materials were obtained from the Psychological Corporation. They supplied all test booklets, answer documents, and administration manuals. These supplies were sufficient for the completion of the project.

G. In addition to the SAT-8 administration manuals provided by the Psychological Corporation, a supplemental manual for use with deaf and hard of hearing students was developed and printed. The supplemental manual addresses issues unique to this population, such as sign communication and out-of-level testing. A copy of this manual is included in Appendix C.

Phase 2: Test administration, scoring, and reporting

A. As programs agreed to participate in the project, they were given screening test information packets for their teachers containing sample screening tests and instructional objectives. The teachers were instructed to review the materials and to determine, based on their knowledge of their students, the appropriate screening test levels to administer. (Since the initial selection is made by the teachers, in the situation where the teachers' judgments of their students abilities are accurate, the screening tests provide confirmation of that judgment and further screening is not necessary.)

As programs determined their screening test needs, they were given sets of tests, directions, and scoring packets. A few additional tests were given to each program for use in rescreening some students, if necessary. Since the screening tests were scored at the testing site, the necessity for rescreening could be determined immediately and additional testing administered without delay. Project personnel provided telephone consultation for the programs during the screening procedures. Based on the screening procedure, programs then determined their SAT-8 materials requirements and placed their orders.

B. The preparation of computer programs and materials to accompany score reports was completed concurrently with the screening test administration. Procedures for producing individual score reports and administrative summaries were developed, then computer programs were written. Individual score reports include the total number of items, the number right/wrong/blank, and the percentage right on each subtest and each item cluster within a subtest. Scaled scores and grade equivalents are also included on each subtest for most students; the only time that they are not included is when the student's score is in the guessing range or the percent correct is 90% or greater. The administrative summary lists information for all of the students in a given program. The Psychological Corporation provided invaluable information to facilitate this portion of the project. They generously supplied computer tapes containing cluster information, scaled scores/grade equivalents, and sample data.

A booklet, Achievement testing of deaf students: The 8th Edition Stanford

Achievement Test, was developed and printed to accompany the individual score reports and administrative summaries. This booklet addresses 22 questions frequently asked regarding the administration and interpretation of the Stanford Achievement Test with deaf and hard of hearing students. All information is updated for specific applicability to the SAT-8. A copy of this booklet is included in Appendix D.

The Psychological Corporation provided conversion tables for equating their 7th Edition Stanford scaled scores with their 8th Edition scores. The tables have been made available to programs in the project upon their request. CADS wrote an introduction explaining the use of the tables. A copy of the introduction is included in Appendix D.

Score summary sheets for tracking students' growth in six subject areas were developed and disseminated. A copy of this document is included in Appendix D.

In addition to the individual score reports and administrative summaries, Student-Problem (S-P) analysis is provided to all programs for the reading comprehension and mathematics computation subtests. The necessary computer programming and documentation preparation were completed at the same time as the other score report materials. S-P analysis goes beyond the standardized score achieved by the student to examine individual item responses (i.e., the pattern of correct and incorrect answers which a student makes on a particular subtest.) This analysis is a product of the Office of Educational Testing, Research & Service, University of Illinois at Urbana-Champaign, under the supervision of Dr. Delwyn Harnisch. A documentation booklet was written and printed for distribution with the analysis results. A draft of this booklet is included in Appendix D.

C. Testing was completed over a 3-month period during the spring 1990 semester. It would have been preferable to complete all testing within the same month, but constraints placed on the various participating programs made that impossible. Many of the programs were required to conform to their own state mandates regarding standardized testing. An examination of the programs that were the earliest and the latest to test showed that, in general, they were representative of the remainder of the data base in terms of their demographic characteristics. Since all demographic groups of interest were adequately represented in each of the early, middle, and late testing groups, the time of testing did not produce a source of bias.

D. The project personnel maintained a flow of materials and provided telephone consultation for the programs during the testing period. As completed tests were received, they were prepared for machine scoring in batches at the publisher's scoring center in San Antonio.

E. As soon as the tests in each batch were scored and the tape was received from the Psychological Corporation, CADS prepared score reports and distributed them to the participating programs as quickly as possible. It was important that the programs receive their scores in time for the preparation of their annual Individualized Education Program (IEP) reports.

F. The SAT-8 test results from the norming group were used as the basis for the norming data files. The files were organized in a format the facilitate merging with the 1989-1990 Annual Survey and the longitudinal data.

Phase 3: Norms development

A. The test data files were merged with student demographic, audiological, and school data from CADS' 1989-90 Annual Survey of Hearing Impaired Children and Youth. The merged data base was also linked with other longitudinal data bases for further analysis.

B. Although a representative sample of the Annual Survey was selected, some programs did not test all of their deaf and hard of hearing students in the target age range. While this varied somewhat by age and by ethnic category, the overall effect was underrepresentation of students in local schools and overrepresentation of those in special schools. In addition, the subsequent examination of demographic variables revealed that the sample underrepresented students with less than severe hearing loss and overrepresented those with severe and profound losses.

To insure that the Stanford 8th Edition norms adequately represent the target population, the norming sample was weighted before the norms were computed. Weights were applied for the purpose of equating the norming sample proportions to those of the 1989-1990 Annual Survey with each age group according to three variables: (1) program type, (2) level of hearing loss, and (3) ethnic category. The distribution of ethnic background in the norming sample was similar to the distribution in the target population. However, since the observed discrepancy in program type varied somewhat by ethnic category, this variable was weighted in the norming sample to assure that adequate representation was given to all ethnic groups.

Table 1.4 in the technical manual (Appendix B) contains the proportion of students 7 through 20 years of age without reported mental retardation in the 8 stratification groups for the target population in the 1989-1990 Annual Survey and for the final norming sample. Although the overall proportions in special and local schools in the weighted norming sample are equal to those in the target population, there are slight discrepancies within each of the four regions. The sample was not weighted for region, however, because examination of the data revealed no regional differences in test scores.

Table 1.5 in the technical manual (Appendix B) contains the distribution of selected demographic characteristics for the target population in the 1989-1990 Annual Survey and for the norming sample. Characteristics are organized into two categories: (1) characteristics on which the sample was not weighted and (2) characteristics on which the sample was weighted before the norms were computed. As shown in this table, students 8 through 13 years of age were underrepresented and students 9 through 20 were overrepresented in the sample. The sample was not weighted according to age, however, because it would not affect the norms. All norms for deaf and hard of hearing students are computed and reported within each age group. Normative comparisons are never made across age groups.

As shown in Table 1.5, the distribution of males and females was almost identical in the sample and the Annual Survey. In addition, there were no major differences in the presence of additional handicapping conditions. There were no notable differences with respect to age at onset and cause of deafness. A slightly higher proportion of students in the sample had onset of hearing loss at birth or before age 3. Although the sample was not directly weighted for age at onset, the process of weighting for program type had the effect of also adjusting for this variable.

Norms in the form of percentile ranks were computed for deaf and hard of hearing students. Cumulative frequency distributions of scaled scores, broken down by the age of the students at the time of testing, were first computed. Then the cumulative distributions were converted to percentile ranks, and the norms tables developed for deaf and hard of hearing students, ages 8 through 20, for each level and relevant subtest of the SAT-8. These norms were printed and made available to educators and to researchers in the field of hearing impairment. A copy of this norms booklet is included in Appendix E.

The group of 20-year-olds in the sample was too small to compute separate sets of norms. A comparison of the distribution of their test scores with those of the 19-year-olds for each subtest revealed that they were very similar for all subtests. Therefore, they were combined to form one norm group for 19- and 20-year-olds.

Seven-year-olds were also included in the sampling design, but the number of test scores obtained for this age group was too small to allow separate norms to be computed. A comparison of the distribution of their test scores with those of the 8-year-olds revealed that they were quite different for some subtests. Therefore, it was not feasible to combine them into one norm group.

Since the test items are exactly the same items administered to hearing students, a double comparison is available to programs using the SAT-8: (1) age-based percentile norms, a comparison of a school's deaf and hard of hearing students to students in the norming sample; (2) test level-based grade equivalent norms, a comparison of deaf and hard of hearing students to hearing students in the original publisher's norming.

Phase 4: Analysis and dissemination

A. The norming data were merged with the 1989-90 Annual Survey data, creating a rich data base which allowed the examination of those factors which correlate with achievement. In this portion of the analysis, achievement results, as measured by scaled score performance on SAT-8 in the various subtest areas, were correlated with demographic, handicapping, and program variables. Using a general linear model, analyses were performed to study the program effects while controlling for the confounding effects of the demographic variables. Reporting the effects of school/program placement is especially important due to the mainstreaming controversy surrounding many deaf and hard of hearing students. A draft of the paper reporting the results of this analysis is included in Appendix E.

B. Individual records from all three Stanford norming projects were combined into one data base. This data base also contains a standard set of demographic variables taken from the Annual Survey. Using conversion tables provided by the test publisher, the scaled scores from the SAT-6 and SAT-7 were converted to the scale metric of SAT-8. Finally, a variable which identified the norming year was added to each student's record.

Initially, a multiple regression was performed to determine the effects of the norming year on achievement. This analysis observed achievement growth while controlling for program type and various demographic characteristics. Subsequently, important subgroups of the population were examined (e.g., students with profound hearing loss), using appropriate multivariate analyses to determine whether achievement levels for these specific subgroups have improved. A draft of the paper reporting the results of this analysis included in Appendix E.

C. In addition to the overall age-based norms, other norms were computed for various population subgroups (e.g., norms by program type, degree of hearing loss, additional handicapping conditions, etc.). The population of deaf and hard of hearing students in the United States is extremely heterogeneous with respect both to educational programming and to demographic and audiological characteristics. This heterogeneity can lead to misconceptions in interpreting the percentiles of individual students. The special norms tables allow more appropriate comparisons to be made.

The sampling design employed by this study did allow for adequate representation of all possible subgroups that might be of interest. However, to the extent that specific groups were adequately represented, special norms were computed. For the subgroups, decile tables rather than full percentile tables were produced in order to avoid erroneous percentile judgments in situations where the subgroup has a small N in the norming data base.

The tables show, for students with specific characteristics, scaled score distributions at each age level for various Stanford subtests. These tables are contained in Section 4 of the technical manual (Appendix B). Table 4.1 in the technical manual lists the subgroups for which special norms are provided.

The scaled score distributions for these subgroups are shown in two ways. First, a series of tables is provided containing the means and standard deviations of the scaled scores at each age level for various Stanford subtests within each subgroup. Then a series of decile tables is provided for these same subgroups.

Deciles are provided instead of percentiles because dividing the sample for these special norms considerably reduced the number of students in each group. The calculation of individual percentile ranks would have required larger samples. Deciles divide distributions into 10 equal parts, while percentiles divide distributions into 100 equal parts. Thus scorers in the first through tenth percentiles are in the first decile, scorers in the eleventh through twentieth percentiles are in the second decile, etc.

D. Three reliability and one validity analyses were performed. The three reliability analyses included the standard error of measurement, a measure of internal consistency, and an index of item discrimination for each subtest. The validity analysis used a measure of construct validity. These analyses are reported in Section 2 of the technical manual (Appendix B).

The standard error of measurement for each subtest is reported in Table 2.1 of the technical manual. This statistic allows the construction of an interval around an observed raw score within which it can be fairly certain the true score lies. The width of this confidence interval is directly related to the reliability of the test.

Cronbach's alpha, which is equivalent to Kuder-Richardson-20 (KR-20) for dichotomously scored items, was computed as a measure of internal consistency. For subtests measuring a homogeneous set of skills or behaviors, items have item discrimination indices that are positive and moderate in size. The alpha values are reported in Table 2.1 of the technical manual.

Corrected point biserial correlations were used as an index of item discrimination. This statistic describes the relationship between a dichotomously scored item and the test score comprised of the remaining items. The results of this analysis are summarized in Table 2.2 of the technical manual.

Construct validity evidence was examined in terms of correlations among scaled scores for several subtests. Generally, subtests that are closely related in the domain measured are expected to produce scores that are highly correlated, demonstrating convergent validity. In addition, subtests that differ substantially in the domain measured are expected to have lower correlations among their scores, demonstrating divergent validity. This results of this analysis are presented in Tables 2.3 and 2.4 of the technical manual.

An item analysis which compares the item responses of the deaf and hard of hearing sample to the responses of hearing students from the publisher's norming is in progress. This analysis employs a Rasch analysis in which the relative difficulty of the test items for the deaf and hard of hearing sample are compared to those resulting when the items were analyzed with hearing students. This technique "forces" certain item parameters derived from the hearing standardization onto the item data from the deaf and hard of hearing standardization and then assesses the degree to which these data "fit" the model, as prescribed by the hearing student item data. The results of this analysis identify individual items and subtests where unique problems exist for deaf and hard of hearing examinees. A draft of the paper reporting the results of this analysis is included in Appendix E.

E. Eleven regional and national workshops were held to disseminate information on administering the SAT-8 to deaf and hard of hearing students and to train participants in ways students, parents, teachers, and administrators can appropriately interpret and use the test results. The workshops contained four modules: screening procedures, test administration procedures, score interpretation, and preliminary research results. By varying the amount of time and emphasis given to the various modules, each workshop was tailored to the specific needs and interests of its participants.

The workshops were conducted at: (1) Pennsylvania School for the Deaf, Philadelphia; (2) California School for the Deaf, Fremont; (3) North Dakota School for the Deaf, Devil's Lake; (4) Sunshine Cottage School for the Deaf, San Antonio, TX; (5) Texas Education Agency, San Antonio; (6) Montgomery County Public Schools, MD; (7)

Bergen County Public Schools, NJ; (8) South Metropolitan Association for Low-Incidence Handicapped, Flossmoor, IL; (9) Pre-session of the Biennial Meeting of the Convention of American Instructors of the Deaf, New Orleans, LA; (10) Regular session of the Biennial Meeting of the Convention of American Instructors of the Deaf, New Orleans, LA; and (11) Gallaudet University. All of these sites were able to provide support services to make the workshops accessible to disabled participants.

Gallaudet University supported the expense of informal videotaping of some of the workshops. The videotapes allowed evaluation of the earlier workshops and thus facilitated improvement of subsequent workshops. They will also provide the basis for formulating a future project to develop and produce a workshop in a professional-quality videotape format.

F. CADS sought both formal and informal input from the field of deaf education. Preliminary drafts of documents developed in the project were sent to teachers and administrators for review. Informal round table discussions were held with project personnel and educators from the Model Secondary School for the Deaf and Kendall Demonstration Elementary School, both on the Gallaudet University campus. Discussions centered around testing procedures and test score interpretation.

Formal ongoing evaluation was provided by an internal review task force. This task force was composed of deaf, hard of hearing, and hearing professionals who are members from the academic community. The members brought to the task force a variety of backgrounds related to the project, including assessment, curriculum development, and classroom experience in the content areas being measured. The task force reviewed materials and provided advice on procedures.

The workshops also played a role in evaluation. Participants were encouraged to share their concerns about testing deaf and hard of hearing students, thus providing CADS with guidance in making the reports of the test results more useful. Feedback from the workshop participants were noted both in person and on videotape.

CADS' ongoing communication with schools in the field of deaf education also has provided valuable evaluative feedback. This includes schools that were not in the norming project, as well as those who participated.

Continuing analyses

We encouraged all programs participating in the norming project to send us their completed screening tests, along with their comments. This screening test data has been entered into a computer file for analysis. The screening tests will be evaluated in terms of their adequacy in assigning SAT-8 levels.

We are working on the production of a score interpretation guide, based on the content and structure of the workshops. Feedback received during the workshops will be incorporated into the guide.

Dissemination

CADS disseminated more than 26,000 SAT-8 tests, along with supporting materials, during the 1990-1991 school year.

The technical manual and norms booklet are made available to all Annual Survey participants.

SAT-8 workshops are conducted on an on-going basis with costs being shared between Gallaudet University and the agencies requesting the workshops.

Papers now in progress will be disseminated through a Gallaudet Research Institute monograph series and through scholarly journals.

APPENDIX A

SCREENING TEST MATERIALS

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

READING

Primary 1

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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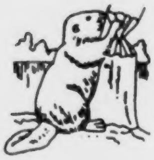
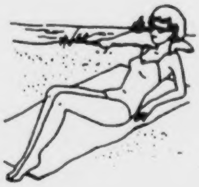
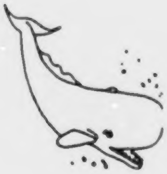
1 I can swim.

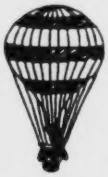
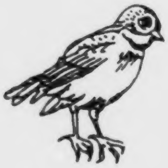
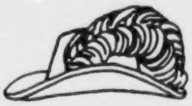
I cannot walk.

○ ○ ○

2 It flies.

It has feathers.

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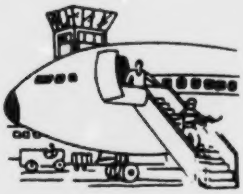


3 Bill went on a trip. He took a big

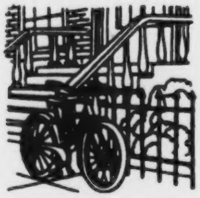
airplane **bus** **ship.**

○ ○ ○

4 It flew high in the

trees **sky** **ocean.**

○ ○ ○



5 Carol has a new

bicycle **friend** **brother.**

○ ○ ○

6 It is in front of her

farm **house** **store.**

○ ○ ○

Jake Gets a Letter

Dear Jake,
Please come to my house for lunch on Sunday. My grandmother will be there. She likes to play games. Then we will go to the park after we eat. It will be fun.

Your friend,
Ellen

7 Later, Jake and Ellen will go to the

zoo	park	circus
○	○	○

8 Who else will be at Ellen's house? Her

○ grandmother
○ aunt
○ grandfather

9 Jake is Ellen's

father	brother	friend
○	○	○

10 Ellen wants Jake to come for

a party	dinner	lunch
○	○	○

Mighty Milk

It is important to drink milk every day. Milk helps your bones to grow and be strong.

11 This story is about a good

food	pet	time.
○	○	○

12 Milk is most important for your

hair	bones	skin.
○	○	○

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SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

READING

Primary 2

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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Who Lives Where?

Different animals live in different kinds of homes. Skunks, rabbits, and field mice make warm nests from soft grass and dead leaves. Chipmunks dig tunnels, and bats live in caves. Frogs live near ponds. Barn owls and squirrels live in trees. Storks are known to build their nests on rooftops.

1 Which animal lives near water?

Owl	Skunk	Squirrel	Frog
○	○	○	○

2 Bats live in --

tunnels	caves	trees	fields
○	○	○	○

3 Which animal digs a tunnel?

○ Chipmunk
○ Skunk
○ Rabbit
○ Mouse

4 This story was written in order to

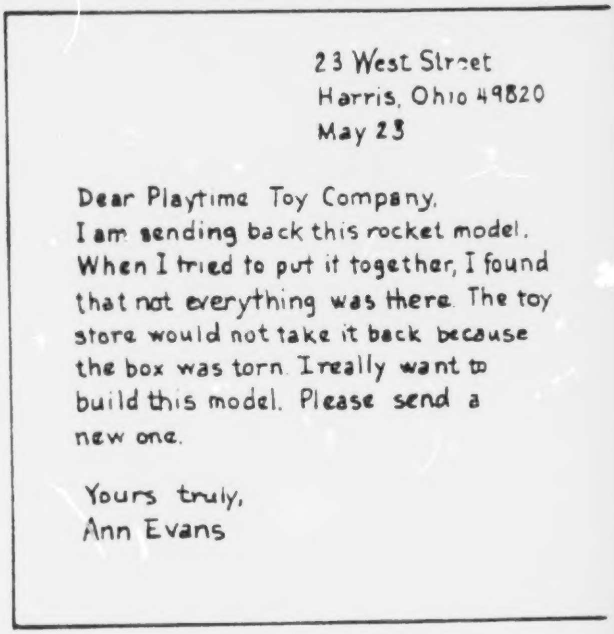
○ tell you something funny

○ teach you something about animals

○ teach you how to make an animal house

○ frighten you

Ann's Letter



23 West Street
Harris, Ohio 49820
May 23

Dear Playtime Toy Company,
I am sending back this rocket model. When I tried to put it together, I found that not everything was there. The toy store would not take it back because the box was torn. I really want to build this model. Please send a new one.

Yours truly,
Ann Evans

5 Ann bought a model --

○ plane

○ car

○ ship

○ rocket

6 Ann could not build the model because --

○ she did not have glue

○ some parts were broken

○ she did not have directions

○ some parts were missing

7 Ann wrote this letter to ask for --

○ another model

○ a new box for her model

○ a book about models

○ her money back

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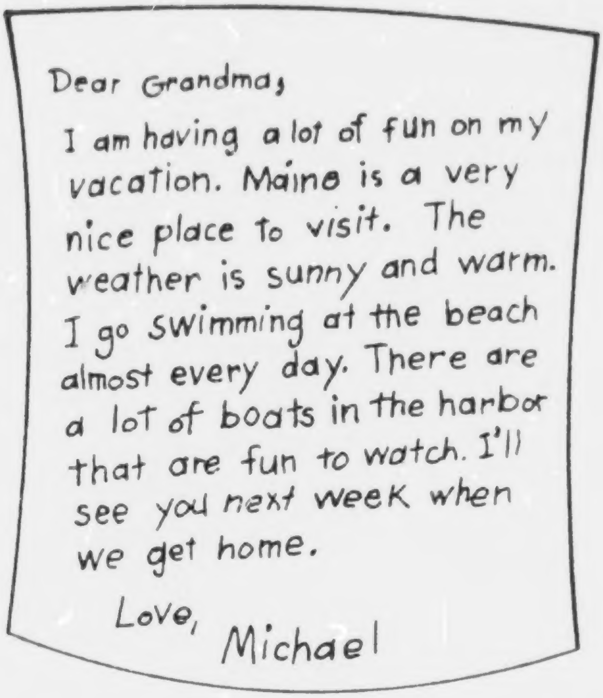
A Letter from Michael



Dear Grandma,

I am having a lot of fun on my vacation. Maine is a very nice place to visit. The weather is sunny and warm. I go swimming at the beach almost every day. There are a lot of boats in the harbor that are fun to watch. I'll see you next week when we get home.

Love,
Michael

8 At the beach, Michael especially likes looking at --

○ shells

○ sea gulls

○ boats

○ swimmers

9 Which of these is a fact?

○ Michael's parents like the beach.

○ Michael is a very good swimmer.

○ Maine has very nice beaches.

○ Michael went to Maine.

10 What does Michael do almost every day?

○ Swim

○ Go on a boat ride

○ Build a sand castle

○ Go to the movies

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SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

READING

Primary 3

Student: ____________________

Birthdate: ____________________

School: ____________________

Teacher: ____________________

Number of Items Right ________ Test Level Assignment ________

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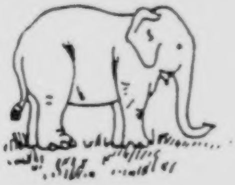
DIRECTIONS
Read each passage. Then read each question about the passage. Decide which is the best answer to the question. Mark the space for the answer you have chosen.



Elephants

There are two kinds of elephants in the world, African and Asian. African elephants are the larger of the two. They can be as tall as eleven feet at the shoulder and can weigh as much as six tons. African elephants have large ears and very wrinkled, gray skin.

Asian elephants are smaller than African elephants. Asian elephants stand about eight to ten feet tall. Along with their smaller ears, Asian elephants have smooth, gray skin that is covered with white or pink spots. They are much friendlier and easier to train than African elephants. People have worked with Asian elephants for thousands of years, making use of their strength and ability to carry things with their trunks.

Both types of elephants drink about thirty gallons of water a day. They also love to be in the water. Elephants are happiest when they are taking a bath. When there is not enough water for a bath, they take showers by spraying water out of their trunks onto their bodies. Elephants are very good swimmers and can swim for long distances.

1 Asian and African elephants are alike in their --

○ feelings toward people
○ size
○ willingness to work
○ enjoyment of water

2 Asian elephants are probably easier to train than African elephants because Asian elephants are --

○ faster
○ smaller
○ friendlier
○ braver

3 Compared to African elephants, Asian elephants have --

○ smaller ears and rougher skin
○ smaller ears and smoother skin
○ larger ears and smoother skin
○ larger ears and rougher skin

4 You can tell from the story that an elephant's trunk is very --

○ useful
○ clumsy
○ sensitive
○ dangerous

5 You would be most likely to find this story in a book about --

○ animals
○ Africa
○ zoos
○ rivers and lakes

Casey

Casey was loose again! Sandy saw him flash by the window as he ran off. How he hated to be on his leash! From the day she first found the collie, she had tried to find his owner by placing advertisements in the local newspaper and by hanging posters in the neighborhood. She had even managed to get an announcement on the radio. No one ever came for him. The puppy was hers now, and what a headache he could be.

Sandy jogged with Casey every day to tire him out. She played outside with him every chance she got. He was a wonderful friend except for this one bad habit. Well, thinking about Casey was not going to help. Sandy ran out to try to find him before the dogcatcher did.

6 To find Casey's owner, Sandy tried all of these EXCEPT --

- ○ advertising in the newspaper
- ○ hanging posters
- ○ announcing it on the radio
- ○ asking the neighbors

7 How did Sandy know that Casey was loose again?

- ○ The gate was open.
- ○ His leash was lying on the ground.
- ○ She saw him run by the window.
- ○ His doghouse was empty.

8 Casey's one bad habit is --

- ○ running away
- ○ chewing the furniture
- ○ digging in the garden
- ○ breaking the windows

9 When Sandy finds Casey, she will probably --

- ○ hide him
- ○ bring him home
- ○ find his owner
- ○ jog with him

10 In trying to find Casey's owner, Sandy probably described Casey by saying --

- ○ "His name is Casey."
- ○ "He likes to play."
- ○ "He is a wonderful friend."
- ○ "He is a collie puppy."

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

READING

Intermediate 1

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each passage. Then read each question about the passage. Decide which is the best answer to the question. Circle the letter next to the answer you have chosen.

Tricky Insects

Certain kinds of insects, called *cryptic* insects, use disguises to protect themselves from their enemies. Most cryptic insects are also very good at staying still for a long time. The walkingstick, the praying mantis, the katydid, and most moths are cryptic insects.

The walkingstick got its name because it looks like the twig it often sits on. Many of its enemies don't even notice it. The praying mantis looks just like the green leaf on which it is frequently found. Their coloring makes katydids almost invisible in the woods or forest. Some katydids are green, some are brown, and others are both green and brown. Brown and white moths blend into the leaves on the forest floor. One moth has brown wings with large open patches. When it rests on a leaf, the green shows through and the moth seems to become part of the leaf.

1 How are cryptic insects protected from their enemies?

- **a** A shell covers them.
- **b** They are silent.
- **c** They look like their surroundings.
- **d** They stay in their nests.

2 A praying mantis looks like --

- **a** the forest floor
- **b** a twig
- **c** a green leaf
- **d** a moth

3 A walkingstick looks like a --

- **a** green leaf
- **b** small branch
- **c** piece of bark
- **d** pine needle

Getting Ready

Jerry knew something was wrong. The horses in the barn were restless, and that was a sure sign that bad weather was on the way. Jerry's grandfather had once told him that animals had a "sixth sense" about weather. He had also told Jerry about the worst blizzard he could remember, when his family was stranded in their cabin for ten days because the snow reached clear to the roof. Jerry knew that if a blizzard were on the way, he had better start preparing for it before his grandfather returned from town. First, he rounded up the cows and put them in the corral, bringing in extra feed for them. Then he chopped some extra wood to keep the house warm. Finally, he made sure the storm windows were tight so the wind would not blow in. As he finished, the first snowflakes were beginning to fall, and his grandfather's truck drove up to the house. Jerry and his grandfather could feed the other animals.

4 The last thing Jerry did was to --

- **a** round up all the cows
- **b** lead the horses to safety
- **c** check the storm windows
- **d** put extra feed in the corral

5 Snow once kept Jerry's grandfather from --

- **a** telephoning his neighbors
- **b** starting a fire
- **c** leaving his home
- **d** cooking his dinner

6 What word best describes Jerry?

- **a** Smart
- **b** Lazy
- **c** Curious
- **d** Humorous

7 What will Jerry and his grandfather probably do next?

- **a** Chop some wood
- **b** Feed the horses
- **c** Light the lanterns
- **d** Repair the windows

WEATHER FORECAST

Friday: *Partly cloudy, with a possibility of clearing later in the day. Winds increasing to 15 M.P.H. by evening. Temperatures in the city will reach a daytime high of 70°; overnight low of 46°. Cooler in the mountains.*

Weekend: *Mostly cloudy with a few periods of sunshine; increasing humidity and possibility of thunderstorms late Sunday. Daytime high will be 75°; nighttime low, 45°. Cooler in the mountains.*

Almanac: *Average temperature for this date: High–80°, Low–65°*

8 What are the high and low temperatures forecast for the weekend?

a High--75°, Low--45°
b High--70°, Low--46°
c High--75°, Low--65°
d High--70°, Low--45°

9 Compared to the lower areas, the weather in the mountains is --

a more stormy
b warmer during the day
c cooler
d more humid

10 Which of these best summarizes the forecast for Friday?

a Clear during the day turning to thunderstorms in the evening; increasing winds
b Clouds during the day; possible clearing by late afternoon; increasing winds
c Daytime wind and cloudiness; wind decreasing toward evening
d Clear and humid during the day; increasing cloudiness toward evening

11 This area is most likely a --

a village in the mountains
b mountain town near a river
c national park in the mountains
d city near the mountains

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

READING

Intermediate 2

Student: ____________________

Birthdate: ____________________

School: ____________________

Teacher: ____________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each passage. Then read each question about the passage. Decide which is the best answer to the question. Circle the letter next to the answer you have chosen.

A Friend's Visit

When would Mark arrive? Jake looked through the terminal window, but there was still no sight of the plane. He hadn't seen Mark for almost five months, and he missed the good times they had before Mark and his family had moved away. They both enjoyed bicycling and hiking in the hills. Their favorite times had always been on rainy afternoons when they played one of their favorite games. Jake hoped that Mark still enjoyed those games now that he had new friends. Inside of the brightly-wrapped package Jake held was a brand new game that he thought Mark would like -- at least, the old Mark who used to live down the block.

Jake looked back at the window and saw that the plane was coming in for a landing. He felt a little nervous, but he recognized Mark instantly. "Hi!" Jake called, hurrying up to his old friend. "I brought you something." He handed the package to Mark.

"I brought you something, too," said Mark, and he handed Jake a package that was the identical size and shape. The boys sat down and quickly unwrapped their gifts. They looked at each other and grinned.

1 What was the boys' favorite pastime?

- a Playing baseball
- b Hiking
- c Playing games
- d Bicycling

2 When did Mark and Jake especially enjoy being together?

- a In bad weather
- b After school
- c During holidays
- d On weekends

3 Jake began to feel nervous because he wondered if Mark --

- a would remember him
- b would get lost
- c had changed
- d had brought him a gift

4 Which sentence summarizes best what Jake learned about friends?

- a People should always take presents to friends.
- b People can be friends even if they live far apart.
- c People who like to play games will be friends.
- d Friends should visit each other as often as possible.

5 At the end of the story, how did Jake know that he and Mark were still friends?

- a They worried about the same thing.
- b They looked like each other.
- c They gave each other the same gift.
- d They both liked to travel.

Family Plans

	Mom	Dad	Julie	Kevin
MONDAY	Office 7:30 Raquetball w/Jane		Julie - I want you to practice every day this week!	5:30 SWIM PRACTICE
TUESDAY	Hospital 8:00 PTA Meeting	6 00 Tennis	5 00 Soccer Practice	5 30 SWIM PRACTICE
WEDNESDAY	Hospital 7.00 Exercise Class	9.05 - Flight 463 I'll be at the Harris Hotel in Louisburg	4 00 Piano Lesson	Kevin - don't forget to put the casserole in the oven at 5 30
THURSDAY	Office 7.00 Swim meet 9.45 Airport	Flight #501 out of Louisburg	5:00 Soccer Practice	7 00 SWIM MEET
FRIDAY	Hospital 11:30 Orthodontist 8 00 Hospital Dinner	6 00 Tennis		11 30 ORTHODONIST
SATURDAY	9:30 Soccer Game 1:00 Sparky to Vet 7:30 Wilsons here for dinner	8 00 Dentist 9 30 Soccer [illegible] Jim - Please try to get the garage cleaned today!	Julie + Kevin — you are both to clean your rooms today! 9 30 Soccer Game 2 00 Kay's birthday party	3 00 SWIM PRACTICE RAKE LEAVES

6 Mom is probably going to the airport on Thursday to --

- **a** pick up Dad
- **b** buy a ticket
- **c** meet a friend
- **d** catch a plane

7 Sparky is probably a --

- **a** friend
- **b** pet
- **c** child
- **d** coach

8 Who is responsible for dinner on Wednesday?

- **a** Dad
- **b** Julie
- **c** Kevin
- **d** Mom

9 Dad isn't scheduled to go to the swim meet because he will be --

- **a** at the hospital
- **b** playing tennis
- **c** out of town
- **d** with the Wilsons

10 What will Mom do on Wednesday evening?

- **a** Go to the hospital
- **b** Attend a meeting
- **c** Go to the movies
- **d** Exercise

11 What will Julie do Saturday afternoon?

- **a** Play with Kevin
- **b** Go to a party
- **c** Rake leaves
- **d** Go to the library

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SCREENING TEST

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STANFORD

Achievement Test

READING

Intermediate 3

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each passage. Then read each question about the passage. Decide which is the best answer to the question. Circle the letter next to the answer you have chosen.

A Case of Jitters

Josh couldn't sleep. He didn't know which he felt more -- excitement or anxiety. It was going to be terrific playing the regional baseball championship tomorrow, but he was nervous about playing in front of so many people.

Everybody would be counting on him. His parents would be there, along with his sister. How would they feel if he made a gigantic error? The coach and his teammates would be depending on his ability in center field: he'd be very upset if he disappointed them.

Worrying about it all, Josh tossed and turned. Suddenly, he sat up in bed as another thought occurred to him.

"Wait a minute!" he said to himself. "What are the worst things that could happen? I could drop a pop fly, throw the ball to the wrong base, even strike out with the bases loaded. But, hey, we've already made it to the regionals. So, we couldn't play all that badly! I'll even hit a homerun!"

Grinning at that image, Josh snuggled under the comforter and fell asleep.

1 Josh was unable to sleep mainly because he was nervous that --

a the game would be cancelled
b he wouldn't get a chance to play
c his team would lose the game
d he would disappoint people

2 Josh seems to be a person who --
a remains calm under pressure
b wants to do a good job
c depends on his sister
d does not usually sleep soundly

3 Josh finally decided to stop worrying about the game because he realized that --

a he probably would end up hitting a homerun
b his mistakes would affect the score
c he and the team had already proven they were good
d the game wasn't important to him in the long run

4 Josh worried about all of these *except* --

a throwing to the wrong base
b dropping a fly ball
c striking out with the bases loaded
d the team's record of winning

5 Josh thought first about his --

a parents
b sister
c coach
d teammates

AGENDA

Regular Meeting
Groveland Homeowners' Association
Tuesday, April 2, at 7:30 P.M.
Westwood Public Library

I. CALL TO ORDER: Minutes of the last month's meeting to be read and approved

II. OLD BUSINESS: Committee Reports:
  A. Street repairs
  B. Sidewalk maintenance
  C. Membership
  D. Finance: Association dues increase

III. SPECIAL REPORTS:
  A. An Association newsletter: Mr. Potter
  B. A general spring cleanup: Ms. Menendez
  C. Trimming trees and shrubs: Mr. & Mrs. Karinsky (There will be slides.)
  D. Neighborhood safety: Dr. Marchant

IV. NEW BUSINESS:
  A. The annual block party
  B. Installing traffic lights at Main and Chestnut
  C. Conversion of Howard School to apartments
  D. Rezoning Garver Street for business use

Note 1: If you have any new business not listed on this agenda, please call the Secretary, Mrs. Harding, before noon on Tuesday at 555-6794.

Note 2: After the meeting, Ms. Kerrwood, the Groveland librarian, will meet with interested parents to discuss a spring/summer activities program to be sponsored by the library in cooperation with the Groveland-Westwood Elementary School District.

---

6 Old business will be discussed at the meeting after --

a a report by Mr. and Mrs. Karinsky
b the discussion of traffic lights
c a report by Mrs. Harding
d the reading of the minutes

7 The group's meetings are held --

a every week
b once a month
c every two months
d once a year

8 Mr. Jones is giving a report about fixing potholes on Elm Drive. On what committee does Mr. Jones probably serve?

a Street Repair
b Neighborhood Safety
c Sidewalk Maintenance
d Finance

9 The discussion about money for the association will occur immediately after the committee report on --

a the block party
b tree trimming
c the newsletter
d membership

10 Mrs. Adams is concerned about a large, cracked tree limb. She will probably discuss it as part of the report given by --

a Mr. and Mrs. Karinsky
b Mr. Potter
c Ms. Menendez
d Dr. Marchant

11 In what season will this meeting be held?

a Spring
b Summer
c Autumn
d Winter

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

READING

Advanced 1

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
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The Painting Project

Belinda stood waiting for Carmen in the hall. Carmen had promised to help Belinda paint her new apartment at ten o'clock, but there was no sign of her. The apartment door was ajar, so Belinda began to move all of her painting equipment inside.

Belinda worried that the job was more than she could handle. She wasn't sure if she had enough paint or the right kind of brushes. Even though she had some drop cloths, could she manage to avoid spattering the floor? The walls looked pretty high. Perhaps she should have borrowed the extension ladder instead of the smaller stepladder from Mrs. Kelly.

Belinda became more nervous the longer she waited for Carmen, so she decided to get started. She stirred the cheery paint and hoped it would make the apartment more like home. The studio apartments in the new building were all alike and seemed impersonal.

Belinda worked for an hour and then realized that it was lunchtime. Now she was even more concerned about Carmen. It wasn't like her to be late. Belinda went down the hall in search of a phone to call Carmen at home. As she turned a corner, she was startled to see Carmen sitting outside the door of another apartment.

"Carmen! I'm so glad to see you, but where have you been?"

"Belinda, I've been waiting for *you* for almost two hours," answered her friend. "You said to meet you outside apartment 309, and this is 309."

Belinda began to laugh. "I hope," she said, trying to gain control of herself, "that the people who've rented 319 like blue!"

1 Belinda was concerned about all of these *except* the --

a size of the ladder
b amount of paint
c cost of the equipment
d type of brushes

2 At the end of the story, Belinda found that she had --

a painted the wrong apartment
b forgotten to tell Carmen when to meet her
c told Carmen the wrong apartment number
d chosen the wrong color paint

3 At the beginning of the story, Belinda expected Carmen to be --

a outside the building
b in the apartment
c next to the telephone
d in the hallway

4 Belinda wanted the new apartment to look --

a roomy
b homey
c sunny
d well-furnished

5 How did Belinda feel when she left the apartment?

a Angry
b Worried
c Satisfied
d Disappointed

6 You can tell from the story that Carmen was usually --

a disorganized
b reliable
c nervous
d clumsy

Baseball Statistics

There is a group of baseball fans who love the statistics as much as the sport itself. For these people, the "stats" are as essential as eating. Armchair athletes read daily statistics in the sports section of the newspaper. There, they find box scores for the games played the day before, *tables* filled with statistics about the leading hitters and pitchers in each league, and records for each team. If that isn't enough to satisfy these number-hungry fans, there are plenty of inexpensive books filled with detailed information dating back to the earliest days of professional baseball.

One reason why statistics are so appealing to some fans is that the statistics provide a way of comparing players. In 1985 Pete Rose of the Cincinnati Reds surpassed Ty Cobb's record for most career hits. The two players never played against each other. Cobb's career spanned the years 1905-1928; Rose started his professional career in 1963. Fans pulled out record books to determine which player had the highest career batting average, the most home runs and stolen bases, and dozens of other career statistics.

Baseball statistics also help fans get through the long, cold winter when there are no games to watch or read about. During the off-season, many fans find consolation in their record books, looking over the stats and making World Series predictions for the upcoming season. Then, when the first ball is hit out of the ballpark, the fans can see how accurate their forecasts have been.

7 As used in this story, *table* means a --

a chart
b piece of furniture
c meal
d place to play games

8 When did Pete Rose play his first big league game?

a 1905
b 1928
c 1963
d 1985

9 You can tell from the story that baseball statistics fans enjoy --

a keeping souvenirs
b writing letters
c playing baseball
d comparing numbers

10 The writer compares some baseball fans' need for statistics to most people's need for --

a exercise
b vitamins
c food
d newspapers

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

READING

Advanced 2

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS

Read each passage. Then read each question about the passage. Decide which is the best answer to the question. Circle the letter next to the answer you have chosen.

Congratulations to your organization for choosing to sell magazines under our famous MONEY-PLUS MAGAZINE PLAN! Remember --

You earn MONEY for your group
AND
PRIZES for yourself:

$350 total sales--4 movie passes
$450 total sales--Personal-sized radio
$550 total sales--Giant teddy bear
$650 total sales--Quartz crystal watch
Grand Prize --35mm camera!

Enclosed is your personal sales packet with:

Brochures listing over 500 magazines
Your personal SALES CODE NUMBER
Supply of SALES SLIPS (triplicate forms)
Special envelope for cash or checks

SOME TIPS TO REMEMBER

1. Start selling now! Sell to friends, neighbors, relatives, -- New or renewal gift subscriptions too!
2. Be sure to fill out a separate sales slip for each subscription. Fill each sales slip out completely.
3. Customers may pay with cash or by check (Checks should be made payable to your organization).
4. Turn in your cash, checks, and sales slips often (Your organizations will explain the procedures to you).
5. Always give the back copy of sales slip to your customer as a receipt.

SAMPLE SALES SLIP

New ☐
MAGAZINE TITLE: Football Digest Renew ☑
(List exactly as in brochure. No abbreviations.)
No. of Years 2 Total price $24.00
Subscriber Name Bartholomew Rossiter
Street Address 1218 Jefferson Blvd.
City Bronxville State CA Zip 91282
Full name of organization Bronxville Boosters Club
Full name of salesperson: David Longman
Salesperson's code: 24625
Date 8/1 Ck. ☑ Cash ☐

1 Which of these is *not* allowed?

- a Taking gift subscriptions
- b Abbreviating the name of the magazine
- c Writing with a red pen
- d Selling to relatives

2 Which of these must be included on the sales slip?

- a Date of the sale
- b The salesperson's phone number
- c Publisher of the magazine
- d The subscriber's phone number

3 A 35mm camera will be awarded to the --

- a school with the highest total sales
- b person with the highest daily sales
- c school that sells the most magazines
- d person with the highest total sales

4 The personal sales packet contains --

- a the telephone number of the company
- b an entry blank for the sales conference
- c a number assigned to the salesperson
- d sample magazines for subscribers

5 If paying by check, the customer must make it payable to --

- a the sponsoring organization
- b Money-Plus Magazine Plan
- c the salesperson
- d the magazine publisher

Ocean Mapping

For as long as human beings have sailed the oceans, they have tried to chart its *contours*. Without reliable maps and other navigational tools, exploration, and even leisurely travel, is dangerous. The land beneath the ocean is as irregularly shaped as the land above the surface, and a sea captain must know about any obstacles below the surface that could endanger a ship.

In the past, oceanographers charted the ocean's depths by dropping a weighted wire overboard and measuring how far the wire dropped. This proved to be an unreliable method, however, since ocean currents generally prevented the weight from dropping straight down.

Today, the wire and weight method is rarely used. Modern oceanographers and geologists use technological methods to determine the depth and shape of the ocean floor. The most common technique uses sonar waves. Scientists know the rate at which sound moves through water. By bouncing high frequency sound waves off of the ocean floor and measuring the time it takes for them to return, a scientist can figure the depth of the ocean at that point. It takes several "soundings" to assemble an accurate map of the sea bed in an area.

Deep submersion vehicles, traveling just above the ocean floor, allow scientists to view the ocean floor with their own eyes. At these great depths, the sunless ocean is pitch black; powerful searchlights on the submersible allow the scientists to see clearly. Maps made using this method have revealed that in some places, the ocean is deeper than the highest mountain on earth, Mount Everest, is tall--29,028 feet.

As measurement equipment and procedures become more sophisticated, scientists are able to learn more about the world under the oceans. Some day, the floor of the ocean may be as well-charted as the ocean's surface.

6 To map the ocean's *contours* means to map its --

a floor
b depth
c width
d currents

7 In this story, the author compares the ocean's depths to --

a the length of a wire
b the height of a mountain
c the speed of sonar waves
d thick-hulled submersion vehicles

8 According to the story, scientists have given up the wire and weight method because it is --

a time-consuming
b dangerous
c too costly
d inaccurate

9 To use the sonar method, the scientist must first send a sound wave to the ocean bottom and then --

a submerge a mechanical probe
b wait for the sound to return
c calculate the speed of sound through water
d determine the length of the wire

10 This story is mainly about --

a using underwater vehicles
b the role of oceanographers
c charting the ocean bed
d high frequency sound waves

11 The main advantage of the submersion vehicle method is that --

a oceanographers can see everything firsthand
b it is less costly than sonar
c oceanographers are able to take photographs
d many scientists can work at one time

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Primary 1

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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1)
$$\begin{array}{r} 4 \\ 5 \\ +\ 1 \\ \hline \end{array}$$

9	11	12	NH
○	○	○	○

2) $7 + 7 = \square$

13	14	15	NH
○	○	○	○

3)
$$\begin{array}{r} 5 \\ 2 \\ +\ 5 \\ \hline \end{array}$$

14	13	12	NH
○	○	○	○

4)
$$\begin{array}{r} 340 \\ +\quad 8 \\ \hline \end{array}$$

42	340	348	NH
○	○	○	○

5)
$$\begin{array}{r} 65 \\ +\ 23 \\ \hline \end{array}$$

68	85	88	NH
○	○	○	○

6)
$$\begin{array}{r} 104 \\ +\quad 5 \\ \hline \end{array}$$

19	109	559	NH
○	○	○	○

7)
$$\begin{array}{r} 9 \\ -\ 2 \\ \hline \end{array}$$

4	5	6	NH
○	○	○	○

8) $8 - 2 = \square$

4	5	6	NH
○	○	○	○

9) 10 - 4 = ☐

5	6	7	NH
○	○	○	○

10)

$$\begin{array}{r} 60 \\ -\,10 \\ \hline \end{array}$$

5	50	70	NH
○	○	○	○

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Primary 2

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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1)

$$\begin{array}{r} 7 \\ +9 \\ \hline \end{array}$$

○ 14
○ 15
○ 16
○ 17
○ NH

2)

$$\begin{array}{r} 7 \\ 4 \\ +6 \\ \hline \end{array}$$

○ 15
○ 16
○ 17
○ 18
○ NH

3)

7 + ☐ = 10

17	5	4	3	NH
○	○	○	○	○

4)

☐ + 6 = 13

6	7	8	19	NH
○	○	○	○	○

5)

$$\begin{array}{r} 26 \\ +64 \\ \hline \end{array}$$

○ 810
○ 90
○ 84
○ 80
○ NH

6)

$$\begin{array}{r} 13 \\ -\ 5 \\ \hline \end{array}$$

○ 6
○ 7
○ 8
○ 9
○ NH

7)

$$\begin{array}{r} 93 \\ -61 \\ \hline \end{array}$$

○ 22
○ 32
○ 33
○ 34
○ NH

8)

$$\begin{array}{r} 56 \\ -14 \\ \hline \end{array}$$

○ 52
○ 42
○ 40
○ 32
○ NH

9)

$$\begin{array}{r} 32 \\ -\ 6 \\ \hline \end{array}$$

○ 24
○ 26
○ 34
○ 36
○ NH

10)

6 x 2 = ☐

4	12	14	18	NH
○	○	○	○	○

11)

5 X 4 = ☐

9	15	20	25	NH
○	○	○	○	○

12)

$$\begin{array}{r} 3 \\ \times\ 8 \\ \hline \end{array}$$

○ 36
○ 26
○ 24
○ 18
○ NH

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Primary 3

Student: ______________________

Birthdate: ______________________

School: ______________________

Teacher: ______________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each question and choose the best answer. Then mark the space for the answer you have chosen. If a correct answer is not here, mark the space for NH.

1)

$$\begin{array}{r} 2645 \\ +\ 352 \\ \hline \end{array}$$

- ○ 2897
- ○ 2987
- ○ 2998
- ○ 3007
- ○ NH

2)

$$\begin{array}{r} 840 \\ +\ 91 \\ \hline \end{array}$$

- ○ 831
- ○ 840
- ○ 931
- ○ 941
- ○ NH

3)

$$\begin{array}{r} 5567 \\ -\ 361 \\ \hline \end{array}$$

- ○ 4106
- ○ 4206
- ○ 5106
- ○ 5208
- ○ NH

4)

$$\begin{array}{r} 8963 \\ -\ 8851 \\ \hline \end{array}$$

- ○ 122
- ○ 113
- ○ 112
- ○ 102
- ○ NH

5)

$$\begin{array}{r} 52 \\ -\ 9 \\ \hline \end{array}$$

- ○ 53
- ○ 47
- ○ 44
- ○ 43
- ○ NH

6)

$$\begin{array}{r} 9 \\ \times\ 5 \\ \hline \end{array}$$

- ○ 36
- ○ 40
- ○ 42
- ○ 45
- ○ NH

7)

$$\begin{array}{r} 14 \\ \times\ 3 \\ \hline \end{array}$$

- ○ 32
- ○ 37
- ○ 38
- ○ 42
- ○ NH

8)

5 x 61 = ☐

315	306	305	255	NH
○	○	○	○	○

9)

16 ÷ 4 = ☐

5	4	3	2	NH
○	○	○	○	○

10)

$4\overline{)\,48}$

10	11	12	20	NH
○	○	○	○	○

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Intermediate 1

Student: ____________________

Birthdate: ____________________

School: ____________________

Teacher: ____________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each question and choose the best answer. Then circle the letter in front of the answer you have chosen. If a correct answer is not here, circle the letter in front of NH.

1)

$$\begin{array}{r} 419 \\ 235 \\ +\ 627 \\ \hline \end{array}$$

a 1261
b 1270
c 1272
d 1281
e NH

2)

$$\begin{array}{r} 2178 \\ -\ 146 \\ \hline \end{array}$$

a 1922
b 1932
c 2022
d 2132
e NH

3)

$$\begin{array}{r} 62 \\ -\ 33 \\ \hline \end{array}$$

a 39
b 31
c 29
d 21
e NH

4)

$$\begin{array}{r} 72 \\ \times\ 6 \\ \hline \end{array}$$

a 372
b 422
c 432
d 442
e NH

5) $8 \times 362 = \square$

a 2876
b 2896
c 3096
d 3346
e NH

6)

$$\begin{array}{r} 71 \\ \times\ 33 \\ \hline \end{array}$$

a 2243
b 2333
c 2343
d 2443
e NH

7) $54 \div 9 = \square$

a 4
b 5
c 6
d 7
e NH

8) $4\overline{)48}$

a 10
b 12
c 14 R2
d 21
e NH

9) $2\overline{)468}$

a 243
b 234
c 230
d 134
e NH

10) $\$3.67 + \$5.29 = \square$

a $8.96
b $8.97
c $9.06
d $9.96
e NH

11) $47.6 - 29.5 = \square$

a 17.1
b 18.1
c 22.1
d 28.1
e NH

12)

$$\begin{array}{r} \frac{3}{7} \\ +\ \frac{3}{7} \\ \hline \end{array}$$

a $\frac{9}{14}$
b $\frac{3}{7}$
c $\frac{1}{2}$
d $\frac{6}{49}$
e $\frac{6}{7}$

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Intermediate 2

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each question and choose the best answer. Then circle the letter in front of the answer you have chosen. If a correct answer is not here, circle the letter in front of NH.

1)
$$\begin{array}{r} 7425 \\ 843 \\ +\ 296 \\ \hline \end{array}$$

a 8564
b 8563
c 8554
d 8464
e NH

2)
$$\begin{array}{r} 815 \\ -\ 175 \\ \hline \end{array}$$

a 760
b 740
c 660
d 630
e NH

3)
$$\begin{array}{r} 6200 \\ -\ \ 555 \\ \hline \end{array}$$

a 5755
b 5745
c 5655
d 5645
e NH

4)
$$\begin{array}{r} 375 \\ \times\ \ 8 \\ \hline \end{array}$$

a 2900
b 2990
c 3000
d 3100
e NH

5)
$$\begin{array}{r} 267 \\ \times\ 97 \\ \hline \end{array}$$

a 20,509
b 24,889
c 25,899
d 25,999
e NH

6) $2\overline{)692}$

a 351
b 346
c 343
d 341
e NH

7) $45\overline{)4770}$

a 104
b 106
c 108
d 160
e NH

8) 27.4 + 8.7 =

a 36.2
b 36.1
c 35.11
d 35.1
e NH

9) 42.3 - 3.8 =

a 4.3
b 38.5
c 39.5
d 41.5
e NH

10)
$$\begin{array}{r} \frac{3}{8} \\ +\ \frac{2}{8} \\ \hline \end{array}$$

a $\frac{5}{64}$
b $\frac{5}{16}$
c $\frac{5}{8}$
d $1\frac{1}{10}$
e $1\frac{1}{4}$

11)
$$\begin{array}{r} 6\frac{3}{4} \\ -\ 1\frac{5}{8} \\ \hline \end{array}$$

a $4\frac{1}{8}$
b $5\frac{1}{8}$
c $5\frac{1}{6}$
d $5\frac{1}{4}$
e $5\frac{1}{2}$

12) $\frac{5}{6} \times \frac{1}{3} =$

a $\frac{5}{18}$
b $\frac{1}{3}$
c $\frac{5}{9}$
d $\frac{2}{3}$
e $\frac{5}{6}$

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Intermediate 3

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each question and choose the best answer. Then circle the letter in front of the answer you have chosen. If a correct answer is not here, circle the letter in front of NH.

1) $\begin{array}{r} 6521 \\ 807 \\ +\ 2094 \\ \hline \end{array}$

a 8422
b 9322
c 9412
d 9422
e NH

2) $\begin{array}{r} 6250 \\ -\ 424 \\ \hline \end{array}$

a 5726
b 5736
c 5826
d 6826
e NH

3) $\begin{array}{r} 674 \\ \times\ 244 \\ \hline \end{array}$

a 164,356
b 164,456
c 164,556
d 165,456
e NH

4) $3\overline{)2541}$

a 747
b $840\ \frac{1}{3}$
c $846\ \frac{1}{3}$
d 847
e NH

5) $34\overline{)719}$

a 21 R5
b 21 R25
c 22 R11
d 31 R15
e NH

6) $\begin{array}{r} 0.064 \\ 0.493 \\ +\ 0.877 \\ \hline \end{array}$

a 0.1434
b 1.334
c 1.424
d 2.010
e NH

7) $50.341 - 26.793 =$

a 33.548
b 24.548
c 23.558
d 23.548
e NH

8) $0.8 \times 0.6 =$

a 0.0048
b 0.048
c 0.48
d 4.8
e 48.0

9) $\frac{1}{3} + \frac{1}{9} =$

a $\frac{1}{6}$
b $\frac{1}{3}$
c $\frac{1}{12}$
d $\frac{2}{3}$
e $\frac{4}{9}$

10) $\frac{1}{8} \times 96 =$

a 24
b 13
c 12
d 8
e NH

11) $6 \div \frac{1}{8} =$

a $\frac{1}{48}$
b $\frac{3}{4}$
c 6
d $6\ \frac{1}{8}$
e 48

12) $\frac{10}{\square} = \frac{5}{8}$

a 4
b 7
c 15
d 16
e NH

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Advanced 1

Student: ____________________

Birthdate: ____________________

School: ____________________

Teacher: ____________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS
Read each question and choose the best answer. Then circle the letter in front of the answer you have chosen. If a correct answer is not here, circle the letter in front of NH.

1) $$\begin{array}{r} 650 \\ -\ \ 29 \\ \hline \end{array}$$

a 631
b 630
c 621
d 521
e NH

2) $$\begin{array}{r} 286 \\ \times\ \ 71 \\ \hline \end{array}$$

a 21,306
b 20,360
c 20,306
d 20,206
e NH

3) $7\overline{)482}$

a $67\frac{6}{7}$
b $68\frac{1}{7}$
c $68\frac{5}{7}$
d $68\frac{6}{7}$
e NH

4) $84\overline{)50568}$

a $601\frac{1}{6}$
b 602
c $602\frac{1}{42}$
d 620
e NH

5) $0.74 \times 0.38 =$

a 281.2
b 28.12
c 2.812
d 0.2812
e 0.02812

6) $43.47 \div 7 =$

a 0.0621
b 0.621
c 6.21
d 62.10
e 621.0

7) $8\frac{7}{8} + 5\frac{1}{4} =$

a $14\frac{1}{8}$
b $14\frac{1}{4}$
c $13\frac{2}{3}$
d $13\frac{7}{12}$
e $13\frac{1}{4}$

8) $8\frac{3}{4} - \frac{5}{6} =$

a $7\frac{1}{3}$
b $7\frac{1}{2}$
c $7\frac{11}{12}$
d $8\frac{1}{3}$
e $8\frac{1}{2}$

9) $\frac{2}{5} \times \frac{3}{4} =$

a $\frac{3}{10}$
b $\frac{8}{15}$
c $\frac{5}{9}$
d $\frac{2}{3}$
e 6

10) $\frac{5}{6} \div 4 =$

a 10
b 5
c $3\frac{1}{3}$
d $\frac{1}{2}$
e $\frac{5}{24}$

11) 25% of 480 =

a 19.2
b 120
c 240
d 455
e NH

12) If $\frac{6}{9} = \frac{x}{8}$, then $x =$

a 11
b 12
c 48
d 72
e NH

SCREENING TEST
For Use with Hearing Impaired Students

STANFORD
Achievement Test

MATHEMATICS

Advanced 2

Student: ______________________________

Birthdate: ______________________________

School: ______________________________

Teacher: ______________________________

Number of Items Right ________ Test Level Assignment ________

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DIRECTIONS

Read each question and choose the best answer. Then circle the letter in front of the answer you have chosen. If a correct answer is not here, circle the letter in front of NH.

1) $\begin{array}{r} 893 \\ \times\ 64 \\ \hline \end{array}$

a 57,252
b 57,152
c 56,152
d 51,152
e NH

2) $8\overline{)457}$

a $56\frac{1}{8}$
b 57
c $57\frac{1}{8}$
d $57\frac{1}{4}$
e NH

3) $85\overline{)38335}$

a $441\frac{8}{85}$
b 451
c $451\frac{2}{17}$
d 452
e NH

4) 360.124 - 19.876 =

a 341.248
b 340.348
c 340.258
d 340.248
e NH

5) 500 x 8.49 =

a 4.245
b 42.45
c 424.5
d 4245
e 42,450

6) $19\frac{1}{4} + 5\frac{5}{6} =$

a $25\frac{1}{12}$
b $24\frac{3}{5}$
c $24\frac{1}{2}$
d $24\frac{1}{4}$
e $24\frac{5}{24}$

7) $2\frac{5}{6} - \frac{1}{3} =$

a $2\frac{2}{3}$
b $2\frac{1}{2}$
c $2\frac{4}{9}$
d $2\frac{1}{6}$
e 2

8) $4\frac{1}{2} \times 1\frac{1}{3} =$

a 6
b $5\frac{5}{6}$
c $4\frac{1}{3}$
d $4\frac{1}{6}$
e $3\frac{3}{8}$

9) $\frac{3}{4} \div 3 =$

a $3\frac{3}{4}$
b 3
c $2\frac{1}{4}$
d $1\frac{1}{12}$
e $\frac{1}{4}$

10) 25% of 240 =

a 600
b 96
c 60
d 9.6
e NH

11) If $x - 18 = 36$, then $x =$

a 2
b 18
c 44
d 54
e NH

12) If $\frac{9}{36} = \frac{3}{y}$, then $y =$

a 27
b 12
c 6
d 4
e NH

HOW TO ASSIGN 8TH EDITION STANFORD ACHIEVEMENT TEST (SAT-8) LEVELS TO HEARING IMPAIRED STUDENTS

To ensure that hearing impaired students are assigned an appropriate level of the SAT-8, CADS has developed eight screening tests in reading and eight screening tests in mathematics. These brief screening tests correspond to the eight difficulty levels of the SAT-8, originally designed for hearing students from the middle of Grade 1 to the end of Grade 9. (The Stanford test is often used with hearing impaired students through the high school years. It is **usually** not suitable for hearing impaired children under age 7.)

Since many of these students develop their reading skills at a slower pace than hearing students of the same age, it is often not possible to assign the proper level of the SAT-8 on the basis of age or grade in school. Hearing impaired students may also be performing mathematically at a different level from their reading skills. This is the reason for the separate screening test in mathematics.

The following steps will help decide which level of the screening tests to administer.

1. **Review the enclosed *Instructional Objectives*** in Reading Comprehension and Mathematics Computation. These objectives are listed according to the eight difficulty levels of the SAT-8 and will give you an idea of the subject matter or content covered in the SAT-8 with the corresponding items on each of the levels of the screening tests.

2. **Review the enclosed screening tests** by looking at their content matter, i.e., the kind of items and the difficulty of the items at each level. (Remember, there are eight levels in reading and eight levels in mathematics.)

3. Based on your knowledge of the student's skills and progress, **assign a screening test level in reading and a screening test in mathematics** for each hearing impaired student. (The reading and mathematics screening tests may be at different levels.) Do not select levels where you know the student will answer every item correctly. Instead, select the screening test level at which you expect the student to answer 50% to 70% of the items correctly; administration of a level that is too easy will not allow you to see how well the student would have performed on a proper test level.

4. After administering the screening test, **score the screening test** with the information found in the *Screening Test Scoring Packet*: "Correct Answer Keys" and *"Guidelines for Assigning SAT-8 Levels* (which will accompany your screening test order.) The enclosed sample, "Teacher's Roster of Students," may be helpful in compiling your list of screening test assignments.

5. **Questions?** Call: 202-651-5575 or 800-451-8834 Ext 5575.

12/90

STANFORD ACHIEVEMENT TEST
8th Edition

Screening Tests
for
Hearing Impaired Students

Instructional Objectives

for

READING COMPREHENSION

and

MATHEMATICS COMPUTATION

Primary 1 through Advanced 2

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READING COMPREHENSION

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
PRIMARY 1 (Designed to be administered to **hearing** students in grades 1.5 - 2.5).		
Two-Sentence Stories: Demonstrate comprehension of a two-sentence story in riddle format by identifying the picture described in the story.	10%	1-2
Short Reading Passages: Demonstrate comprehension of explicit and implicit meanings, details, and sequence in short reading passages by completing sentences presented in modified cloze format.	40%	3-6
Short Reading Passages with Questions: Demonstrate comprehension of explicit and implicit meanings, sequence, and details in short reading passages by answering questions about the passages.	50%	7-12
• • • • • • • • • • •		
PRIMARY 2 (Designed to be administered to **hearing** students in grades 2.5 - 3.5)		
TYPE OF PASSAGE		
Recreational Reading: Demonstrate the ability to construct meaning with material typically read for enjoyment.	38%	8-10
Textual Reading: Demonstrate the ability to construct meaning with material typically found in grade-appropriate textbooks and other sources of information.	30%	1-4
Functional Reading: Demonstrate the ability to construct meaning with material typically encountered in everyday life situations.	33%	5-7
TYPE OF READING SKILL		
Literal Comprehension: Demonstrate the ability to comprehend explicit details and relationships in a variety of reading passages.	48%	1,2,3,5,6,8,10
Inferential Comprehension: Demonstrate the ability to draw conclusions from explicit and implicit information in a variety of reading passages.	50%	---
Critical Comprehension: Demonstrate the ability to synthesize and evaluate explicit and implicit information in a variety of reading passages.	2%	4,7,9

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items

Please note: For test levels Primary 3 through Advanced 2, refer to the instructional objective descriptions in Primary 2.

. . . .

PRIMARY 3 (Designed to be administered to **hearing** students in grades 3.5 - 4.5)

TYPE OF PASSAGE

Recreational Reading:	33%	6-10
Textual Reading:	33%	1-5
Functional Reading:	33%	---

TYPE OF READING SKILL

Literal Comprehension:		
Stated Detail	28%	2,3,6,7
Plot/Action/Sequence	20%	---
Inferential Comprehension:		
Main Idea	6%	---
Drawing Conclusions	19%	1,4,8
Cause and Effect	6%	9
Inferred Meanings	17%	---
Critical Comprehension:	6%	5,10

. . . .

INTERMEDIATE 1 (Designed to be administered to **hearing** students in grades 4.5 - 5.5.)

TYPE OF PASSAGE

Recreational Reading:	33%	4-7
Textual Reading:	33%	1-3
Functional Reading:	33%	8-11

TYPE OF READING SKILL

Literal Comprehension:		
Stated Detail	24%	1,2,3,5,8,9,10
Plot/Action/Sequence	15%	4
Inferential Comprehension:		
Main Idea	7%	6
Drawing Conclusions	13%	11
Cause and Effect	13%	7
Inferred Meanings	15%	---
Critical Comprehension:		
Author's Meaning	7%	---

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
INTERMEDIATE 2 (Designed to be administered to **hearing** students in grades 5.5 - 6.5)		
TYPE OF PASSAGE		
Recreational Reading:	33%	1-5
Textual Reading:	33%	---
Functional Reading:	33%	6-11
TYPE OF READING SKILL		
Literal Comprehension:		
Stated Detail	22%	1,2,8,10,11
Plot/Action/Sequence	17%	---
Inferential Comprehension:		
Main Idea	11%	4
Drawing Conclusions	9%	6
Cause and Effect	7%	3,5,9
Inferred Meanings	20%	7
Critical Comprehension:		
Author's Meaning	7%	---
• • • • • • • • • • •		
INTERMEDIATE 3 (Designed to be administered to **hearing** students in grades 6.5 - 7.5.)		
TYPE OF PASSAGE		
Recreational Reading:	33%	1-5
Textual Reading:	33%	---
Functional Reading:	33%	6-11
TYPE OF READING SKILL		
Literal Comprehension:		
Stated Detail	28%	4,11
Plot/Action/Sequence	11%	5,6,9
Inferential Comprehension:		
Main Idea	9%	---
Drawing Conclusions	11%	2,8
Cause and Effect	6%	1,3
Inferred Meanings	22%	7
Critical Comprehension:		
Author's Meaning	7%	10

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
ADVANCED 1 (Designed to be administered to **hearing** students in grades 7.5 - 8.5)		
TYPE OF PASSAGE		
Recreational Reading:	33%	1-6
Textual Reading:	33%	7-10
Functional Reading:	33%	---
TYPE OF READING SKILL		
Literal Comprehension:		
Stated Detail	22%	1,3,4,5,8,10
Plot/Action/Sequence	11%	---
Inferential Comprehension:		
Main Idea	6%	---
Drawing Conclusions	11%	2
Cause and Effect	13%	---
Inferred Meanings	19%	6,7,9
Critical Comprehension:		
Author's Meaning	6%	---

• • • • • • • • • • •

ADVANCED 2 (Designed to be administered to **hearing** students in grades 8.5 - 9.9.)		
TYPE OF PASSAGE		
Recreational Reading:	33%	---
Textual Reading:	33%	6-11
Functional Reading:	33%	1-5
TYPE OF READING SKILL		
Literal Comprehension:		
Stated Detail	28%	1,2,4,5,7
Plot/Action/Sequence	6%	9
Inferential Comprehension:		
Main Idea	9%	10
Drawing Conclusions	13%	3,8,11
Cause and Effect	9%	---
Inferred Meanings	17%	6
Critical Comprehension:		
Author's Meaning	6%	---

MATHEMATICS COMPUTATION

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
PRIMARY 1 (Designed to be administered to **hearing** students in grades 1.5 - 2.5).		
WHOLE NUMBERS		
Addition Facts Add a column of one-digit numbers.	27%	1-3
Addition, No Renaming Add two numbers with no renaming.	27%	4-6
Subtraction Facts Name the difference for a basic subtraction fact.	23%	7-9
Subtraction, No Renaming Subtract one number from another number with no renaming.	23%	10
• • • • • • • • • • •		
PRIMARY 2 (Designed to be administered to **hearing** students in grades 2.5 - 3.5)		
WHOLE NUMBERS		
Addition Facts Add a column of one-digit numbers.	14%	1-2
Addition, No Renaming Add two numbers with no renaming.	16%	3-4
Addition, Renaming Add two numbers with renaming.	11%	5
Subtraction Facts Name the difference for a basic subtraction fact.	8%	6
Subtraction, No Renaming Subtract one number from another number with no renaming.	16%	7-8
Subtraction, Renaming Subtract one number from another number with renaming.	8%	9
Multiplication Facts Name the product for a basic multiplication fact.	19%	10
Division Facts Name the quotient for a basic division fact.	8%	---

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
PRIMARY 3 (Designed to be administered to **hearing** students in grades 3.5 - 4.5).		
WHOLE NUMBERS		
Addition, No Renaming Add two numbers, with no renaming.	9%	1
Addition, Renaming Add two numbers, with renaming.	18%	2
Subtraction, No Renaming Subtract one number from another number, with no renaming.	9%	3-4
Subtraction, Renaming Subtract one number from another number, with renaming.	18%	5
Multiplication Facts Name the product for a basic multiplication fact.	14%	6
One-Digit Multipliers Multiply a number by a number less than 10.	14%	7-8
Division Facts Name the quotient for a basic division fact.	11%	9
One-Digit Divisors Divide a number by a number less than 10.	7%	10

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INTERMEDIATE 1 (Designed to be administered to **hearing** students in grades 4.5 - 5.5.)

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
WHOLE NUMBERS		
Addition, Renaming	13%	1
Subtraction, No Renaming and Renaming	13%	2-3
Multiplication Facts and One-Digit Multipliers	19%	4-5
Two- and Three-Digit Multipliers	6%	6
Division Facts and One-Digit Divisors	19%	7-9
Two- and Three-Digit Divisors	2%	---
DECIMALS		
Addition with Decimals	6%	10
Subtraction with Decimals	6%	11
FRACTIONS		
Addition of Fractions with Like Denominators	4%	12
Addition of Fractions with Unlike Denominators	4%	---
Subtraction of Fractions with Like Denominators	4%	---
Subtraction of Fractions with Unlike Denominators	4%	---

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
INTERMEDIATE 2 (Designed to be administered to **hearing** students in grades 5.5 - 6.5).		
WHOLE NUMBERS		
Addition and Subtraction, Renaming	16%	1-3
One-, Two- and Three-Digit Multipliers	18%	4-5
One-, Two- and Three-Digit Divisors	18%	6-7
DECIMALS		
Addition with Decimals	7%	8
Subtraction with Decimals	7%	9
Multiplication with Decimals	7%	---
FRACTIONS		
Addition of Fractions with Like and Unlike Denominators	7%	10
Subtraction of Fractions with Like and Unlike Denominators	7%	11
Multiplication with Common Fractions	7%	12
NUMBER SENTENCES AND EQUATIONS		
Missing Elements	4%	---
PROPORTIONS	2%	---
• • • • • • • • • • •		
INTERMEDIATE 3 (Designed to be administered to **hearing** students in grades 6.5 - 7.5).		
WHOLE NUMBERS		
Addition and Subtraction, Renaming	11%	5-6
One-, Two- and Three-Digit Multipliers	11%	9
One-, Two- and Three-Digit Divisors	13%	7-8
DECIMALS		
Addition and Subtraction with Decimals	9%	2-3
Multiplication and Division with Decimals	14%	4
FRACTIONS		
Addition of Fractions with Like and Unlike Denominators	9%	1
Subtraction of Fractions with Like and Unlike Denominators	9%	---
Multiplication with Common Fractions	7%	10
Division with Common Fractions	7%	11
NUMBER SENTENCES AND EQUATIONS		
Missing Elements	5%	---
PROPORTIONS	5%	12

Instructional Objectives	Percent of items on 8th Edition Stanford, Full Battery	Screening Test Booklet Items
ADVANCED 1 (Designed to be administered to **hearing** students in grades 7.5 - 8.5).		
WHOLE NUMBERS		
Addition and Subtraction, Renaming	11%	1
One-, Two- and Three-Digit Multipliers	9%	2
One-, Two- and Three-Digit Divisors	9%	3-4
DECIMALS		
Addition and Subtraction with Decimals	9%	---
Multiplication and Division with Decimals	14%	5-6
FRACTIONS		
Addition and Subtraction of Fractions with Like and Unlike Denominators	13%	7-8
Multiplication with Common and Mixed Fractions	7%	9
Division with Common and Mixed Fractions	7%	10
PERCENT		
Percent of a Number; Percent One Number is of Another	7%	11
NUMBER SENTENCES AND EQUATIONS		
First Degree Equations; Evaluate Algebraic Expressions	9%	---
PROPORTIONS	5%	12
• • • • • • • • • • •		
ADVANCED 2 (Designed to be administered to **hearing** students in grades 8.5 - 9.9).		
WHOLE NUMBERS		
Addition and Subtraction, Renaming	9%	---
One-, Two- and Three-Digit Multipliers	9%	1
One-, Two- and Three-Digit Divisors	9%	2-3
DECIMALS		
Addition and Subtraction with Decimals	4%	4
Multiplication and Division with Decimals	14%	5
FRACTIONS		
Addition and Subtraction of Fractions with Like and Unlike Denominators	14%	6-7
Multiplication and Division with Common and Mixed Fractions	14%	8-9
PERCENT		
Percent of a Number; Percent One Number is of Another; Number that is a Given Percent of Another Number	9%	10
NUMBER SENTENCES AND EQUATIONS		
First Degree Equations; Evaluate Algebraic Expressions; Inequalities	14%	11
PROPORTIONS	4%	12

STANFORD ACHIEVEMENT TEST
8th Edition

Screening Test Scoring Packet

- Correct Answer Keys for Reading and Mathematics Screening Tests
- *Guidelines for Assigning SAT-8 Levels* for reading and mathematics

Center for Assessment and Demographic Studies
Gallaudet University
800 Florida Avenue, N.E.
Washington, D.C. 20002
202/651-5575 or 800/451-8834 ext 5575

READING
SCREENING TEST CORRECT ANSWER KEY

PRIMARY 1

Item #	Correct Answer
1	C
2	B
3	A
4	B
5	A
6	B
7	B
8	A
9	C
10	C
11	A
12	B

PRIMARY 2

Item #	Correct Answer
1	D
2	B
3	A
4	B
5	D
6	D
7	A
8	C
9	D
10	A

PRIMARY 3

Item #	Correct Answer
1	D
2	C
3	B
4	A
5	A
6	D
7	C
8	A
9	B
10	D

INTERMEDIATE 1

Item #	Correct Answer
1	C
2	C
3	B
4	C
5	C
6	A
7	B
8	A
9	C
10	B
11	D

INTERMEDIATE 2

Item #	Correct Answer
1	C
2	A
3	C
4	B
5	C
6	A
7	B
8	C
9	C
10	D
11	B

INTERMEDIATE 3

Item #	Correct Answer
1	D
2	B
3	C
4	D
5	A
6	D
7	B
8	A
9	D
10	A
11	A

ADVANCED 1

Item #	Correct Answer
1	C
2	A
3	D
4	B
5	B
6	B
7	A
8	C
9	D
10	C

ADVANCED 2

Item #	Correct Answer
1	B
2	A
3	D
4	C
5	A
6	A
7	B
8	D
9	B
10	C
11	A

See over for *Guidelines for Assigning SAT-8 Levels* - Reading

READING

Screening Test Levels

Number of Correct Items	P1	P2	P3	I1	I2	I3	A1	A2
0	P1	P1	P2 ST (P2)	P3 ST (P3)	P3 ST (I1)	I1 ST (I2)	I3 ST (I3)	I3 ST (I3)
1	P1	P1	P2 ST (P2)	P3 ST (P3)	P3 ST (I1)	I1 ST (I2)	I3 ST (I3)	I3 ST (I3)
2	P1	P1	P2 ST (P2)	P3 ST (P3)	P3 ST (I1)	I1 ST (I2)	I3 ST (I3)	I3 ST (A1)
3	P1	P1	P3	P3 ST (I1)	I1 ST (I1)	I1 ST (I3)	A1	I3 ST (A1)
4	P1	P1	P3	I1	I2	I3	A1	A2
5	P1	P2	P3	I1	I2	I3	A1	A2
6	P1	P2	P3	I1	I2	I3	A1	A2
7	P1	P2	P3	I1	I2	I3	A1	A2
8	P1	P2	P3	I1	I2	I3	A1	A2
9	P1	P3 ST (P2)	I1 ST (P3)	I1	I2	I3	A1	A2
10	P1	P3 ST (P3)	I1 ST (I1)	I3 ST (I2)	A1 ST (I3)	A1	A2	A2
11	P2 ST* (P1)			I3 ST (I2)	A1 ST (I3)	A1		A2
12	P2 ST (P1)							

***ST means Screening Test.**

GUIDELINES FOR ASSIGNING SAT-8 LEVELS
READING

This table shows appropriate reading SAT-8 test levels to be assigned for specific raw scores on the reading screening tests. To use this table, find the column that corresponds to the screening test level given a student. Then find the row corresponding to that student's raw score (number of items correct) on that screening test. In the box at the intersection of the row and column is listed the recommended SAT-8 reading test level. For example, a student scoring 10 correct on the Intermediate 3 screening test would be assigned the Advanced 1 level on the SAT-8 for reading (and for Mathematics Applications.)

In some cases (where the student has scored at guessing level or close to 100% on the screening test), a second screening test is strongly recommended to locate the best level for a student. If you are unable to give the student a second screening test, assign the level that is indicated in parentheses in the same box as an alternative to the screening test. For example, a student scoring 10 correct on the Intermediate 2 screening test would be retested with the Advanced 1 screening test or (if retesting is not possible) assigned the Intermediate 3 level on the SAT-8.

MATHEMATICS
SCREENING TEST CORRECT ANSWER KEY

PRIMARY 1

Item #	Correct Answer
1	D
2	B
3	C
4	C
5	C
6	B
7	D
8	C
9	B
10	B

PRIMARY 2

Item #	Correct Answer
1	C
2	C
3	D
4	B
5	B
6	C
7	B
8	B
9	B
10	B
11	C
12	C

PRIMARY 3

Item #	Correct Answer
1	E
2	C
3	E
4	C
5	D
6	D
7	D
8	C
9	B
10	C

INTERMEDIATE 1

Item #	Correct Answer
1	D
2	E
3	C
4	C
5	B
6	C
7	C
8	B
9	B
10	A
11	B
12	E

INTERMEDIATE 2

Item #	Correct Answer
1	A
2	E
3	D
4	C
5	C
6	B
7	B
8	B
9	B
10	C
11	B
12	A

INTERMEDIATE 3

Item #	Correct Answer
1	D
2	C
3	B
4	D
5	A
6	E
7	D
8	C
9	E
10	C
11	E
12	D

ADVANCED 1

Item #	Correct Answer
1	C
2	C
3	D
4	B
5	D
6	C
7	A
8	C
9	A
10	E
11	B
12	E

ADVANCED 2

Item #	Correct Answer
1	B
2	C
3	B
4	D
5	D
6	A
7	B
8	A
9	E
10	C
11	D
12	B

See over for *Guidelines for Assigning SAT-8 Levels* - Mathematics

MATHEMATICS

Screening Test Levels

Number of Correct Items	P1	P2	P3	I1	I2	I3	A1	A2
0	P1	P1	P2 ST (P2)	P3 ST (P3)	I1 ST (I1)	I2 ST (I2)	I3 ST (I3)	A1 ST (A1)
1	P1	P1	P2 ST (P2)	P3 ST (P3)	I1 ST (I1)	I2 ST (I2)	I3 ST (I3)	A1 ST (A1)
2	P1	P1	P2 ST (P3)	P3 ST (I1)	I1 ST (I2)	I2 ST (I3)	I3 ST (A1)	A1 ST (A2)
3	P1	P2	P3	I1	I2	I3	A1	A2
4	P1	P2	P3	I1	I2	I3	A1	A2
5	P1	P2	P3	I1	I2	I3	A1	A2
6	P1	P2	P3	I1	I2	I3	A1	A2
7	P1	P2	P3	I1	I2	I3	A1	A2
8	P1	P2	P3	I1	I2	I3	A1	A2
9	P2 ST* (P1)	P2	I1 ST (P3)	I1	I2	I3	A1	A2
10	P2 ST (P2)	P2	I1 ST (I1)	I1	I2	I3	A1	A2
11		P3 ST (P2)		I2 ST (I1)	I3 ST (I2)	A1 ST (I3)	A2	A2
12		P3 ST (P3)		I2 ST (I2)	I3 ST (I3)	A1 ST (A1)	A2	A2

*ST means Screening Test.

GUIDELINES FOR ASSIGNING SAT-8 LEVELS
MATHEMATICS

This table shows appropriate Concepts of Number and Mathematics Computation SAT-8 test levels to be assigned for specific raw scores on the mathematics screening tests. To use this table, find the column that corresponds to the screening test level given a student. Then find the row corresponding to that student's raw score (number of items correct) on that screening test. In the box at the intersection of the row and column is listed the recommended SAT-8 mathematics test level. For example, a student scoring 2 correct on the Primary 2 screening test would be assigned the Primary 1 level on the SAT-8 for Concepts of Number and Mathematics Computation. (Use the student's reading level assignment for Mathematics Applications.)

In some cases (where the student has scored at guessing level or close to 100% on the screening test), a second screening test is strongly recommended to locate the best level for a student. If you are unable to give the student a second screening test, assign the level that is indicated in parentheses in the same box as an alternative to the screening test. For example, a student scoring 11 correct on the Intermediate 1 screening test would be retested with the Intermediate 2 screening test or (if retesting is not possible) assigned the Intermediate 1 level on the SAT-8.

APPENDIX B

DRAFT OF TECHNICAL MANUAL

D R A F T

Technical Manual:
Using the Stanford Achievement Test, Eighth Edition
with deaf and hard of hearing students

Judith A. Holt

Carol B. Traxler

Thomas E. Allen

Center for Assessment and Demographic Studies

Gallaudet University

1992

12/17/91

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PREFACE

The purpose of this manual is to present technical information about the Stanford Achievement Test, 8th Edition (SAT-8; The Psychological Corporation, 1989b) when administered to deaf and hard of hearing students. Form J of the test was normed with a national sample of 6,932 deaf and hard of hearing students in the spring of 1990 by the Gallaudet Research Institute's Center for Assessment and Demographic Studies (CADS). Funding for the project was provided by the U.S. Department of Education, Office of Special Education Programs (Grant Number 84.023C2). Testing materials and scoring were provided by The Psychological Corporation.

The students in the norming sample were selected from a data base developed by CADS through its Annual Survey of Hearing Impaired Children and Youth (Annual Survey). During the 1989-1990 school year, this data base contained demographic, audiological, and educational information on approximately 47,000 deaf and hard of hearing students. As a result of this norming project, age-based percentile ranks for selected curricular areas measured by the SAT-8 have been developed, published, and become part of a computerized score reporting system offered as a service by CADS.

This manual is divided into four sections. In Section 1, the procedures used to select the norming sample are described, and the demographic characteristics of the resulting sample are compared to those of the Annual Survey. In Section 2, evidence for the reliability and validity of the Stanford for the deaf and hard of hearing student population is presented. Section 3 contains a discussion of score interpretation. Included in this section are a description of the standard error of measurement and its implications for determining the statistical significance of gains noted in scores from year to year. Section 4 contains tables showing means and standard deviations, and tables showing decile norms for selected subgroups of the sample. These allow more specific comparisons between individual scores and referenced norm groups than do the previously published norms computed on the entire sample.

Sections 1 and 2 of this manual will be useful for researchers who wish to know the technical properties of the Stanford when it is administered to deaf and hard of hearing students. It will also be helpful for researchers engaged in future large-scale normings of standardized tests with this population. Section 3 will be beneficial to educators who wish to interpret Stanford scores for their students. Section 4 enables educators to be more specific in the normative comparisons they use to make judgments about their students' academic achievement.

This manual is intended to supplement rather than replace previously published material that contains important technical information about the Stanford Achievement Test for use with deaf and hard of hearing students. The reader is directed to the following publications for additional information.

Allen, T. E. (1986). Patterns of academic achievement among hearing impaired students: 1974 and 1983. In A. N. Schildroth & M. A. Karchmer (Eds.), *Deaf Children in America* (pp. 161-206). Boston: College-Hill Press.

Center for Assessment and Demographic Studies. (1989). *Administering the 8th Edition Stanford Achievement Test to hearing impaired students.* Washington, DC: Gallaudet Research Institute.

Center for Assessment and Demographic Studies. (1991a). *Stanford Achievement Test, 8th Edition, Form J: Hearing impaired norms booklet.* Washington, DC: Gallaudet Research Institute.

Center for Assessment and Demographic Studies. (1991b). *Student-problem analysis: A means for studying student responses to test items.* Washington, DC: Gallaudet Research Institute.

Schildroth, A. N. (1990). *Achievement testing of deaf students: The 8th Edition Stanford Achievement Test.* Washington, DC: Center for Assessment and Demographic Studies.

The authors gratefully acknowledge the other team members in this norming project: Mr. Arthur N. Schildroth, editor and Annual Survey liaison; Ms. Sue A. Hotto, graphics artist; Ms. Debra Rose, research technician; Mr. Kevin J. Cole, computer programmer; Mr. Russ Perkins, materials specialist; and Ms. Gail Ries, secretary. CADS also thanks the students and staff from the 535 schools that participated in the norming project. The names of the 106 programs that served as coordinating reporting sources are listed in the Appendix. Without their support, along with that of the U.S. Department of Education and The Psychological Corporation, this important project would not have been possible.

SECTION 1: DESCRIPTION OF THE NORMING SAMPLE

Sampling Procedures

The goal of the norming project was to compute Stanford Achievement Test, 8th Edition (SAT-8), norms for a sample that adequately represented the population of approximately 63,000 deaf and hard of hearing students who receive special education services in schools throughout the United States (U.S. Department of Education, 1989). A data base created through the Annual Survey of Hearing Impaired Children and Youth (Annual Survey) provided the basis for sampling from this population. During the 1989-1990 school year this data base, maintained by the Gallaudet Research Institute's Center for Assessment and Demographic Studies (CADS), contained demographic, audiological, and educational information for approximately 47,000 students.

The schematic diagram in Figure 1.1 (not drawn to scale) shows the norming sample in relation to the Annual Survey, to the population of deaf and hard of hearing students receiving special education services, and to the population of all deaf and hard of hearing youth. The largest circle in the diagram represents approximately 1,000,000 deaf and hard of hearing youth in the U.S., including those with mild bilateral and unilateral impairments (National Center for Health Statistics, 1988). The second largest circle in the diagram, lying totally within the outer circle, represents the population of deaf and hard of hearing students served in special education. The third largest circle represents the approximately 47,000 students in the Annual Survey. A small portion of this circle overlaps the boundary of the second circle, indicating the Annual Survey includes a small number of students not receiving special education services. Those students were not of interest for the norming project because they are not generally placed in a testing situation that would require the use of special norms. The smallest circle represents the norming sample, a subset of the Annual Survey.

Table 1.1
Regions of the United States

Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
Midwest	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
South	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia
West	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

The population of approximately 63,000 deaf and hard of hearing students in special education was further narrowed by considering only a subset of those for whom this norm-referenced achievement test is likely to be appropriate. Students younger than 7 or older than 20 years were excluded from consideration, as were those students reported as having mental retardation as a secondary handicapping condition. Thus, the resulting target population and its representative sample were composed of students in special education aged 7-20 without reported mental retardation.

Since the 1989-1990 Annual Survey data base was not available at the time sampling was completed in 1989, it was necessary to use the data available in the 1988-1989 Annual Survey data base to design an appropriate sampling strategy. Based on the 1988-1989 Annual Survey, it was determined that a sample of approximately 6,300 students would be required to adequately represent the population.[1] A cluster sampling approach was used whereby programs, rather than students, were selected from the Annual Survey.

In spring 1989 CADS conducted a pilot test of screening procedures to be used with the newly released 8th Edition. Programs that participated in the pilot testing were automatically included in the norming sample. In addition, CADS had normed the 7th Edition of the Stanford in 1983 for use with deaf and hard of hearing students, and programs enrolling students who had participated in the norming of the 7th Edition Stanford were also included. These students, numbering about 1,000, were included to allow for assessment of their achievement growth over the intervening seven years.

All of the programs in the U.S. that participated in the 1988-1989 Annual Survey were classified by program type. Eight strata were formed by crossing the four regions of the country with the two program types. Based on those eight strata, a proportional stratified sample was selected. Table 1.1 shows the four Bureau of the Census regions used to stratify the sample and indicates the states included in each. Table 1.2 contains a list of the different types

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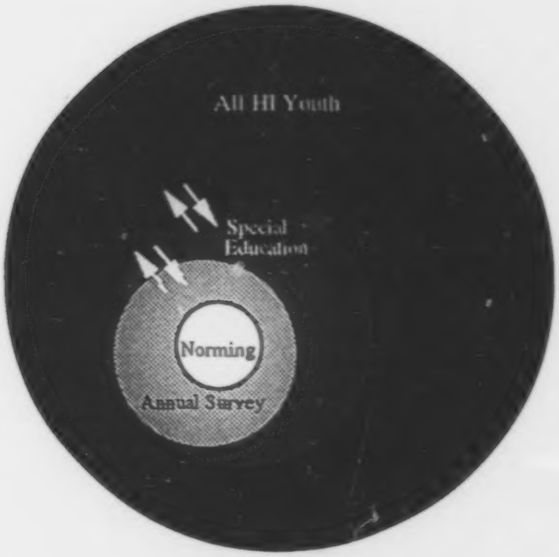
1.

Figure 1.1
The Norming Sample in Context



	Approximate Number of Students	Approximate Number of Programs
Norming Sample	6,900	106
Annual Survey	46,000	1,500
Special Education	63,000	Unknown
All youth with hearing impairments, including mild unilateral impairments	1,000,000	Unknown

Table 1.1
Regions of the United States

Northeast	Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
Midwest	Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
South	Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia
West	Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

of programs that serve as reporting sources who supply data to the Annual Survey and the sampling categories to which these programs correspond. The size of those reporting sources vary from a single school to an entire school system. As shown in Table 1.2, several program types enrolling special groups of students for whom the Stanford is not likely to be appropriate were omitted from the sampling scheme. Only residential and day schools for the deaf and local programs serving both deaf and hearing students were included.

After the programs that participated in the 1989 pilot project and those that enrolled students from the 1983 norming project were placed in the sample, a stratified random cluster sample from the remaining data base was drawn to fulfill the requirements of the sampling design. It was anticipated that some of the programs sampled would decline the invitation to participate. Therefore, a total of 135 programs enrolling more than 10,000 students were sampled to ensure that the final number would be adequate to represent the target population in each of the strata. Of the 135 programs sampled, 106 accepted the invitation to participate. The names of the 106 programs that served as coordinating reporting sources are listed in the Appendix. The programs tested a total of 6,932 students. Table 1.3 contains the number and proportion of the target population in each stratum of the 1988-1989 Annual Survey and the number of programs sampled and participating.

Description of Sample Characteristics

Stratification Variables

As expected, there was only a slight shift in the population between the 1988-1989 Annual Survey (which was the basis for designing the sampling framework) and the 1989-1990 Annual Survey (which was sampled for testing). However, although a representative sample of the Annual Survey was initially selected, response rates varied among strata. This resulted in a sample that differed from the . Annual Survey. While sample proportions deviated somewhat from Annual Survey proportions by age and by ethnic category, a more significant deviation resulted in underrepresentation of students in local schools and overrepresentation of those in special schools. Additionally, examination of other variables revealed that the sample underrepresented students with less-than-severe hearing loss and overrepresented those with severe and profound loss. This is consistent with previous research findings that students with less-than-severe hearing loss are more likely than those with severe or profound loss to be placed in local schools (Schildroth, 1986).

To minimize sampling bias resulting from the differences between the sample proportion and Annual Survey proportion, the norming sample results were weighted before the norms were computed. This insured that the SAT-8 norms adequately represented the target population. Weights were applied to each age group according to three variables: (1) program type, (2) level of hearing loss, and (3) ethnic category.

Although level of hearing loss and program placement are highly related, both variables were incorporated into the weights, since weighting by program type alone would not entirely correct the sample distribution for hearing loss. The sample was also weighted by ethnic category to assure that adequate representation was given to the various ethnic groups. Previous research has shown all three weighting variables to be related to academic achievement (Allen, 1986a).

Table 1.4 contains the proportion of students 7 through 20 years of age in special education without reported mental retardation in the eight stratification groups for the target population in the 1989-1990 Annual Survey and for the sample tested. Although the overall proportions in special and local schools in the weighted norming sample are equal to those in the target population, there are slight variations within each of the four regions. However, the sample was not further weighted for region, for when test scores were subsequently examined for regional differences after the sample had been weighted for program type, hearing loss, and ethnic category, no significant differences were found.

Demographic Variables

Table 1.5 contains the distribution of selected demographic characteristics for the target population in the 1989-1990 Annual Survey and for the norming sample. Characteristics are organized into two categories: (1) those on which the sample was not weighted, and (2) those on which the sample was weighted before the norms were computed.

As shown in this table, the sample underrepresented the students in the target population 7 through 11 years of age by 13% (43% of the Annual Survey vs. 30% of the sample) and overrepresented those 15 through 20 years of age by 13% (33% of the Annual Survey vs. 46% in the sample). This is consistent with the underrepresentation of local schools in the norming sample that was noted in Table 1.4. Previous research has found that younger students are more likely than older students to attend local schools (Schildroth, 1986). The sample was not weighted according to age, however, because all norms for deaf and hard of hearing students are computed and reported *within* each age group. Normative comparisons are never made across age groups.

The group of 20-year-olds in the sample was too small to allow for computation of separate norms. A comparison of the distribution of their test scores with those of the 19-year-olds for each subtest revealed that they were very similar for all subtests. Therefore, they were combined to form one

Table 1.2
Types of Programs in the Annual Survey and Corresponding Sampling Categories

Type of Program	Sampling Category
Residential school for the deaf	Special schools
Day school for the deaf	Special schools
Public or private local school program/system with full-time or part-time special education classes	Local schools
Multihandicapped program	Omitted
Rehabilitation program	Omitted
Preschool program	Omitted
Speech and hearing program	Omitted
Other program	Omitted

Table 1.3
Programs Sampled from the Target Population in the 1988-1989 Annual Survey, Stratified on Region and Program Type

	1988-1989 Annual Survey				
Region/ Prog Type	Students	Proportion of students	Programs	Programs Sampled	Programs Accepted
Northeast					
Special	2,656	.070	31	7	7
Local	5,135	.136	129	23	12
Midwest					
Special	2,005	.053	21	6	6
Local	7,519	.199	224	33	25
South					
Special	4,656	.123	31	7	6
Local	8,424	.222	346	32	27
West					
Special	2,219	.059	26	7	7
Local	5,245	.138	161	20	16
TOTAL	**37,859**	**1.000**	**969**	**135**	**106**

Table 1.4

Proportion of Students, Stratified on Region and Program Type, for the Target Population in the 1989-1990 Annual Survey and for the 1990 Norming Sample

Region/ Program type	Target Population (N=32,886)	Unweighted Norming Sample (N=6,932)	Weighted Norming Sample (N=6,932)
Northeast			
Special	.080	.121	.059
Local	.127	.062	.124
Midwest			
Special	.055	.117	.082
Local	.194	.140	.175
South			
Special	.117	.135	.103
Local	.223	.187	.219
West			
Special	.064	.128	.076
Local	.140	.110	.162
TOTAL	1.000	1.000	1.000

Table 1.5
Proportion of Demographic Characteristics for the Target Population in the 1989-1990 Annual Survey and for the 1990 Norming Sample

CHARACTERISTICS ON WHICH THE SAMPLE WAS NOT WEIGHTED	ANNUAL SURVEY	NORMING SAMPLE	
Age	*N=32,886*	*N=6,932*	
7	.08	.02	
8	.08	.06	
9	.09	.07	
10	.09	.07	
11	.09	.08	
12	.08	.08	
13	.08	.08	
14	.08	.08	
15	.08	.10	
16	.08	.10	
17	.07	.10	
18	.06	.09	
19	.03	.05	
20	.01	.02	
Gender	*N=32,811*	*N=6,932*	
Male	.55	.54	
Female	.45	.46	
Additional handicaps	*N=32,164*	*N=6,520*	
None	.76	.77	
Physical only	.08	.09	
Cognitive (w/ or w/o physical)	.16	.14	
Age at onset of hearing loss	*N=22,023*	*N=4,944*	
At birth or before age 3	.93	.95	
Age 3 or older	.07	.05	
Cause of hearing loss	*N=24,632*	*N=5,394*	
Maternal rubella	.05	.06	
Meningitis	.12	.14	
Heredity	.18	.19	
Otitis media	.04	.02	
Other/Multiple	.27	.26	
Undetermined	.34	.33	
CHARACTERISTICS ON WHICH THE SAMPLE WAS WEIGHTED			
		Unweighted	*Weighted*
Ethnic background	*N=32,546*	*N=6,545*	*N=6,545*
White non-Hispanic	.63	.59	.63
Black non-Hispanic	.17	.19	.17
Hispanic	.14	.16	.14
Other or Multi-ethnic	.06	.06	.06
Hearing loss	*N=32,450*	*N=6,498*	*N=6,498*
Less-than-severe	.41	.22	.41
Severe	.18	.22	.18
Profound	.41	.56	.41

Note: Variation in the size of *N* for each category is due to missing data related to that category.

norm group for 19- and 20-year-olds.

Seven-year-olds were also included in the sampling design, but the number of test scores obtained for this age group was too small to allow separate norms to be computed. A comparison of the distribution of their test scores with those of the 8-year-olds revealed that they were quite different for some subtests. Therefore, it was not considered logical to combine 7- and 8-year-olds into one norm group.

The distribution of males and females was almost identical in the sample and the Annual Survey. In addition, there were no notable differences with respect to age at onset of hearing loss, cause of hearing loss, or the presence of additional educationally relevant handicapping conditions.

Distribution of Test Level Assignments

Typically, development of deaf and hard of hearing students' achievement skills occurs at different rates than for hearing students and occurs unevenly in different subject areas. Rather than being assigned test levels based on age or grade in school, the students in the norming sample were assigned test levels according to procedures recommended by CADS. Prior to the beginning of the norming project, screening instruments were created and pilot tested with a national sample of deaf and hard of hearing students. These screening tests allowed more accurate placement of deaf and hard of hearing students into appropriate levels of the Stanford test battery for specific subject areas.

Screening test items were selected from the item bank created by The Psychological Corporation during their SAT-8 item field test phase. Each item in the bank is accompanied by a description of the instructional objective for which it was written and by a listing of its field test statistics. Reading Comprehension and Mathematics Computation items were selected for inclusion. Reading items were assembled into eight short screening tests corresponding to the eight levels of the SAT-8 (Primary 1 through Advanced 2). Likewise, mathematics items were assembled into eight screening tests. Together the two sets of screening tests were used by teachers to assign students to appropriate test levels for all SAT-8 subtests.

For the CADS pilot testing, the screening tests included more items than were anticipated for the final screening instruments. The pilot test data were analyzed in terms of specific item characteristics, as well as for characteristics of each screening test as a whole. The focus of the analysis was alignment of the screening tests with the corresponding SAT-8 subtest levels. Individual items were analyzed using both traditional item statistics and statistics based on the Rasch model. Each item was evaluated for its difficulty level, discrimination ability, and fit to the test. Items that were extremely easy or difficult, that did not discriminate or discriminated negatively, or that did not provide a satisfactory fit to the test were eliminated. After each item deletion, a new Rasch analysis was performed to verify that the deletion improved the test as a whole. Upon the completion of this process, each screening test contained 10-12 items.

At the beginning of the norming project, the students' English and mathematics teachers were provided information about the Reading Comprehension and Mathematics Computation subtests at each of the eight SAT-8 test levels. This information included a screening test of 10 to 12 test items at each test level, a list of the objectives measured by those items, the proportion of items on the SAT-8 corresponding to each objective, and the grade levels at which the test content was typically taught to hearing students nationally. Teachers were asked to use this information to select levels of Reading Comprehension and Mathematics Computation screening tests to be given to each student. It was suggested that levels be selected at which students would be expected to answer between 50% and 70% of the items correctly. In this range, scores would be higher than the guessing level but would not hit the ceiling of the test.

Screening tests in the two subject areas were administered to corroborate the teachers' test level selections. Based upon the students' performance on the two screening tests, SAT-8 battery levels were assigned. The Mathematics Computation screening test determined the level assignment for the SAT-8 Mathematics Computation and Concepts of Number subtests. The Reading Comprehension screening tests determined the level assignment for all other subtests except Mathematics Applications. The lower of the Mathematics Computation or Reading Comprehension screening tests determined the level assignment for the Mathematics Applications subtest, since that subtest is dependent on prerequisite skills in both reading and mathematics.

The distribution of test level assignments for Reading Comprehension, Mathematics Computation, and Mathematics Applications are presented in Table 1.6. The total number of students assigned to Mathematics Applications levels (5,700) is considerably smaller than the total number of students assigned to the Reading Comprehension (6,573) and Mathematics Computation (6,524) levels because the Mathematics Applications subtest is an optional subtest. In general, students were assigned to higher levels of the battery for their Mathematics Computation and Concepts of Number subtests than for their reading subtests. This result is consistent with previously published research showing that deaf and hard of hearing students, as a group, are farther behind their hearing peers in the development of reading skills than in the development of computational

Table 1.6
Number and Percent of Deaf and Hard of Hearing Students Assigned by Screening Procedures to Different Levels of the Stanford Achievement Test, Spring 1990

	Reading Comprehension		Mathematics Computation		Mathematics Applications	
Primary 1	1625	25%	725	11%	1197	21%
Primary 2	1326	20%	953	15%	1093	19%
Primary 3	1189	18%	948	15%	1009	18%
Intermediate 1	711	11%	854	13%	667	12%
Intermediate 2	466	7%	719	11%	484	8%
Intermediate 3	378	6%	712	11%	396	7%
Advanced 1	479	7%	639	10%	444	8%
Advanced 2	399	6%	974	15%	410	7%
Total	*6573*	*100%*	*6524*	*100%*	*5700*	*100%*

skills (e.g., Allen, 1986a & 1986b).

To summarize, deaf and hard of hearing students in the norming sample were assigned to SAT-8 battery levels based on both their teachers' judgments of their achievement in reading comprehension and mathematics computation and the results of screening tests. The results of the test level assignments, by age, are presented graphically in Figure 1.2 for Reading Comprehension and Figure 1.3 for Mathematics Computation. As is shown in Figure 1.2, the three lowest test levels for Reading Comprehension (Primary 1-3) were assigned to a large percentage of students of all ages from 8 to 18, with as many as 47% of the 18-year-olds assigned one of these three levels. At most ages, the Intermediate and Advanced levels of Reading Comprehension were assigned less frequently than the Primary levels.

Figure 1.3 gives quite a different picture for the Mathematics Computation subtest levels. All eight test levels were assigned to substantial numbers of students, with a clear progression from age 8 to 18. Deaf and hard of hearing students attained higher levels of functioning in the mathematics than in reading, as evidenced by the higher SAT-8 mathematics test levels.

Scoring in the Measurable Range

The term "test score" implies a measurement. It implies that a test taker's achievement in the skills and content measured by a test has been accurately assessed. However, when using tests, especially multiple choice tests, it is possible to obtain a score that is not a valid measurement. Such a score does not reflect the test taker's achievement. In order to discourage the use of test scores that are questionable, CADS has defined, for each SAT-8 subtest, a range within which scores may be considered acceptable indicators of student achievement. This is referred to as the "measurable range."

If a student were to guess all the answers to a multiple choice test, that student could **by chance** receive a score of 33% on a test with three answer choices per item, 25% with four answer choices, and 20% with five answer choices. Such a score should not automatically be considered a valid measure of the student's achievement on the content or skills assessed by the test. Indeed, CADS specifies "chance level" as the lower boundary of the SAT-8 measurable range.

A similar problem can occur with multiple choice tests that are very easy for a test taker. When students answer all (or nearly all) of the test items correctly, it is not possible to tell whether their achievement is well measured. By hitting the ceiling of the test with perfect scores or with just a few incorrect responses, students are not given a fair chance to demonstrate their true achievement levels. We can discern that they know those skills or content that are measured by a too-easy test, but we cannot discern how much more the students know. (For example, would the student also have been able to answer more difficult items correctly? If so, how much more difficult?) For the SAT-8, only scores above chance level and below 90% correct are considered within the measurable range.

Scores outside the measurable range are associated with greater measurement error and less accurate score estimation. That is why teachers are asked to assign Stanford test levels at which they expect students to answer between 50% and 70% of the items correctly. Generally, students who scored at chance level should have been given a lower test level, and students scoring at or above 90% should have been given a higher test level. (It should be noted that when CADS produces computerized score reports from SAT-8 tapes, norms are not reported for scores outside the measurable range.)

Figure 1.4 depicts the measurable ranges of scaled scores for the six most widely-used SAT-8 subtests. The Reading Comprehension measurable range is in Figure 1.4.a, Mathematics Computation in Figure 1.4.b, Concepts of Number in Figure 1.4.c, Mathematics Applications in Figure 1.4.d, Spelling in Figure 1.4.e, and Total Language in Figure 1.4.f. The measurable range for each subtest is illustrated as a line extending from the lowest measurable score to the highest measurable score. The ends of the line show the scaled score and the grade equivalent score associated with the lowest possible score above chance level and the highest possible score below 90% correct.

Norming sample and the measurable range

The vast majority of students who took the Stanford as part of the norming project scored in the measurable range. Scores used in calculating the norms were only those in the measurable range, with two exceptions: scores at or below chance level on Primary 1 and scores at or above 90% correct on Advanced 2. Although these extreme scores are not interpretable for individual students, they were used in the calculation of percentile ranks in order to reflect the entire range of achievement of deaf and hard of hearing students.

Table 1.7 shows the number of students, by age and test level, whose scores were used in calculating norms for the Reading Comprehension and Mathematics Computation subtests. This table may be used to see which test levels were taken by students of a particular age or to see the age distribution for a particular test level.

Table 1.8 shows the mean percent correct scores for each subtest. It is apparent that test levels were well assigned since the mean percentages are concentrated between 50 and 70.

SECTION 2: INDICATORS OF TEST QUALITY

Figure 1.2
Reading Comprehension Test Level Assignments, by Age

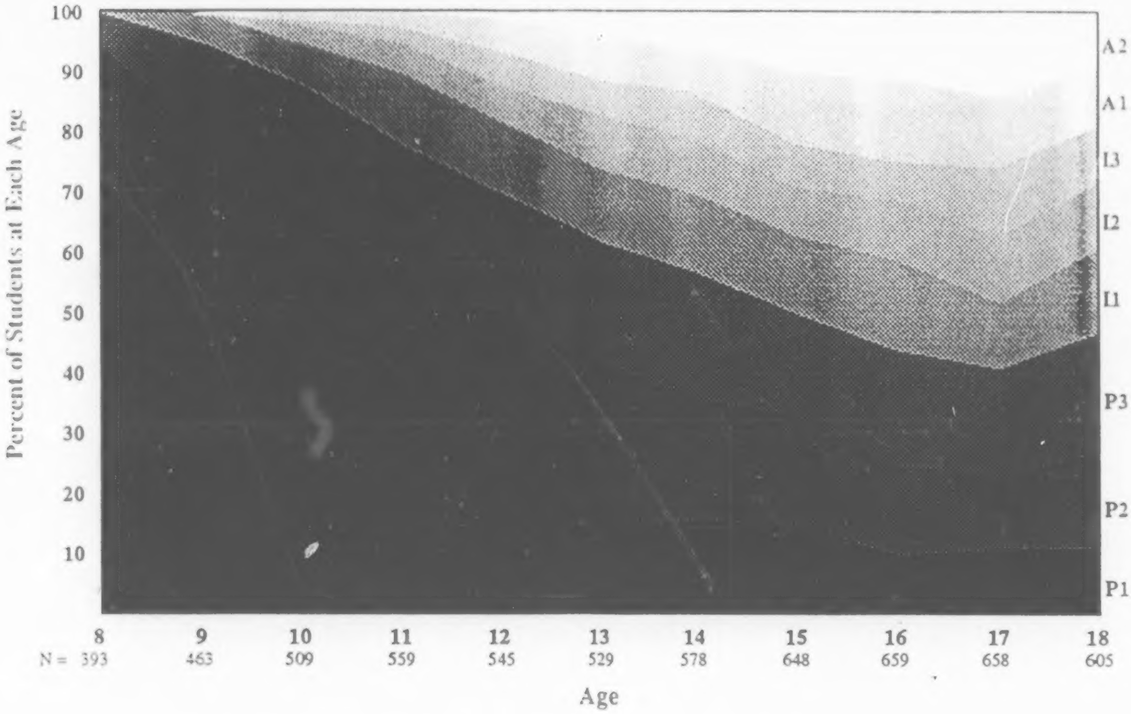


Figure 1.3
Mathematics Computation Test Level Assignments, by Age

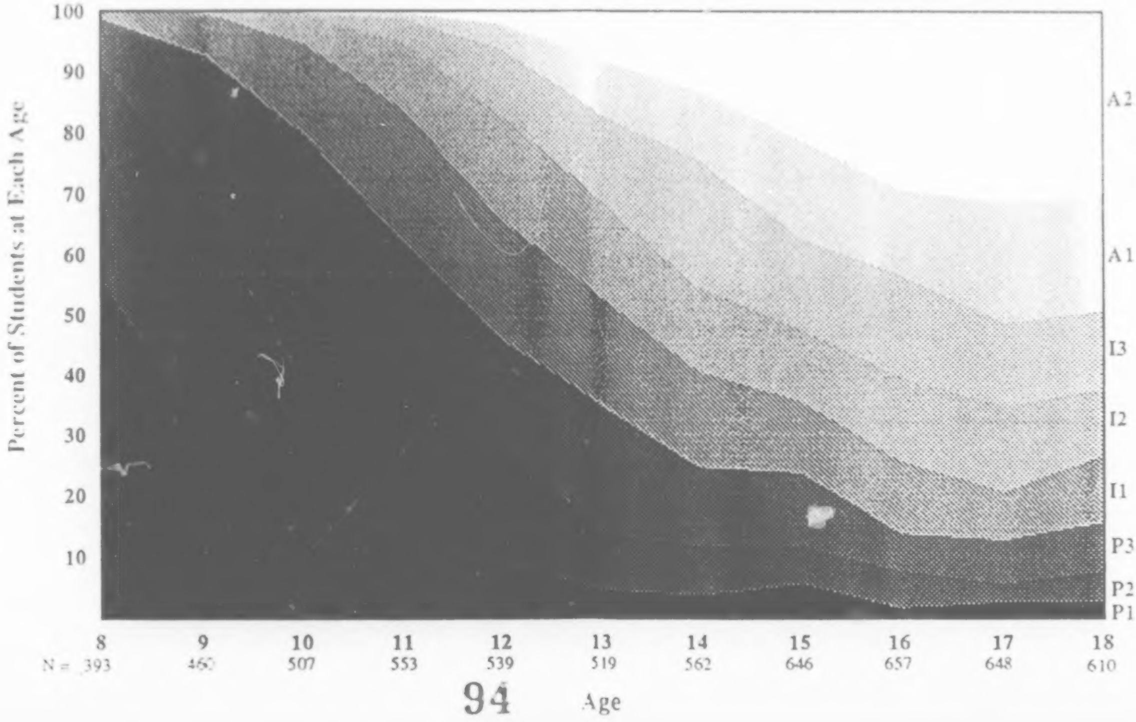


Figure 1.4

Measurable Range of the SAT-8 Subtest Levels

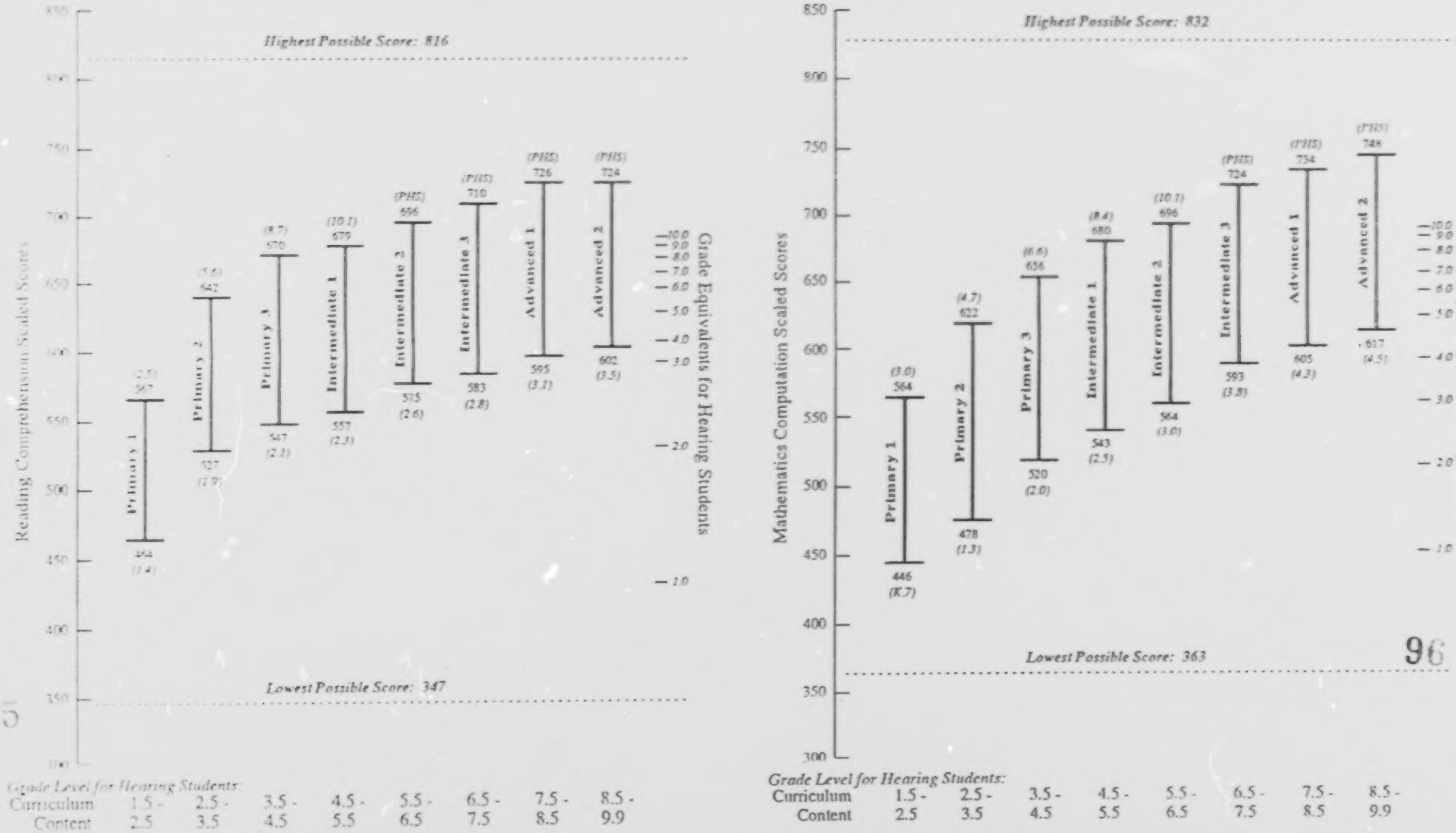


Figure 1.4.a. Reading Comprehension

Figure 1.4.b. Mathematics Computation

Figure 1.4 (con't)

Measurable Range of the SAT-8 Subtest Levels

Figure 1.4.c. Concepts of Number

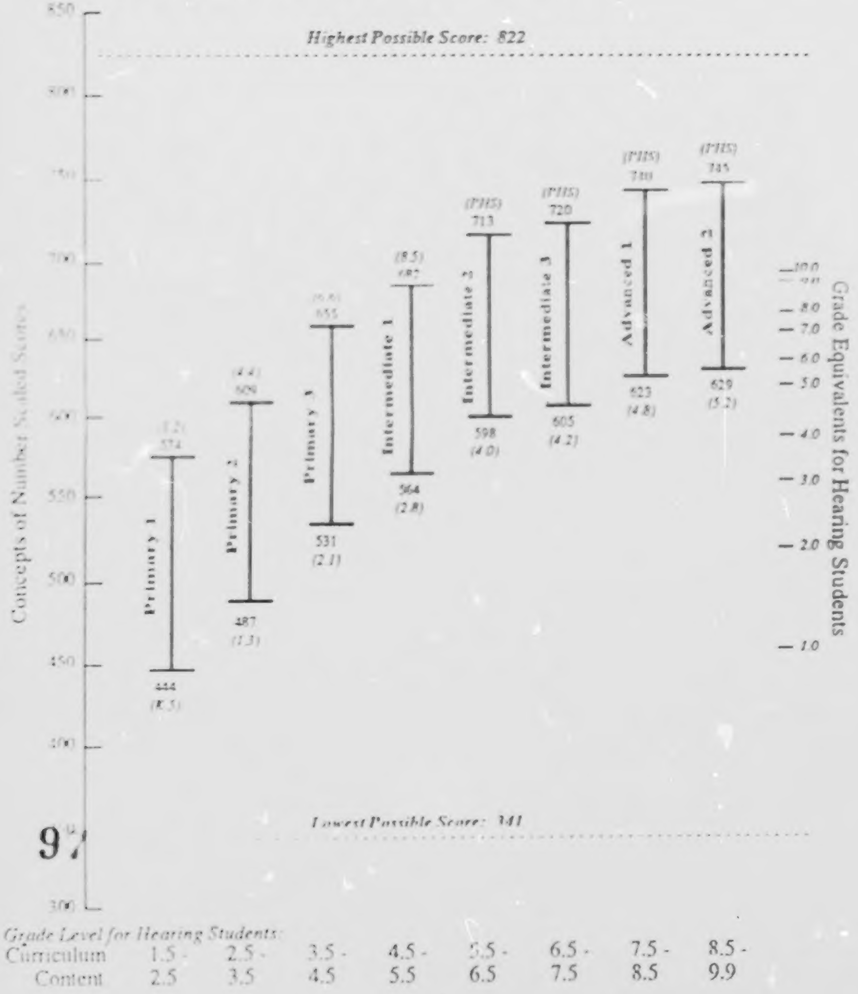


Figure 1.4.d. Mathematics Applications

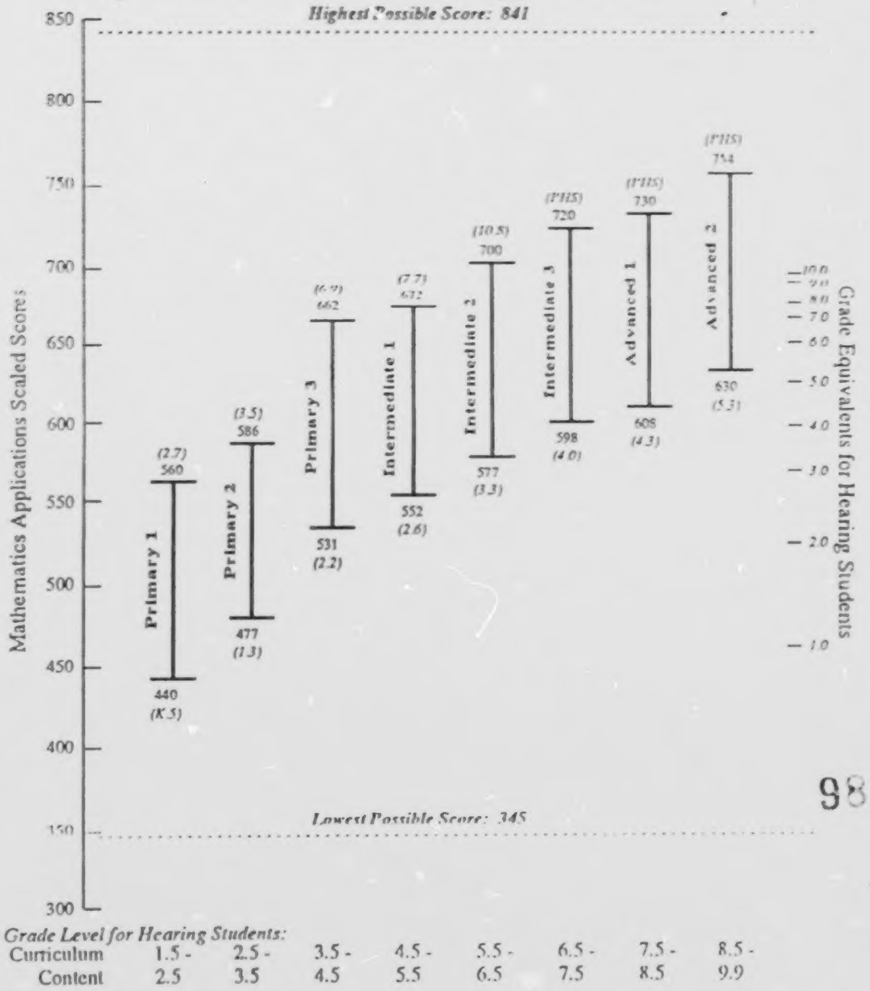


Figure 1.4 (con't)

Measurable Range of the SAT-8 Subtest Levels

Figure 1.4.e. Spelling

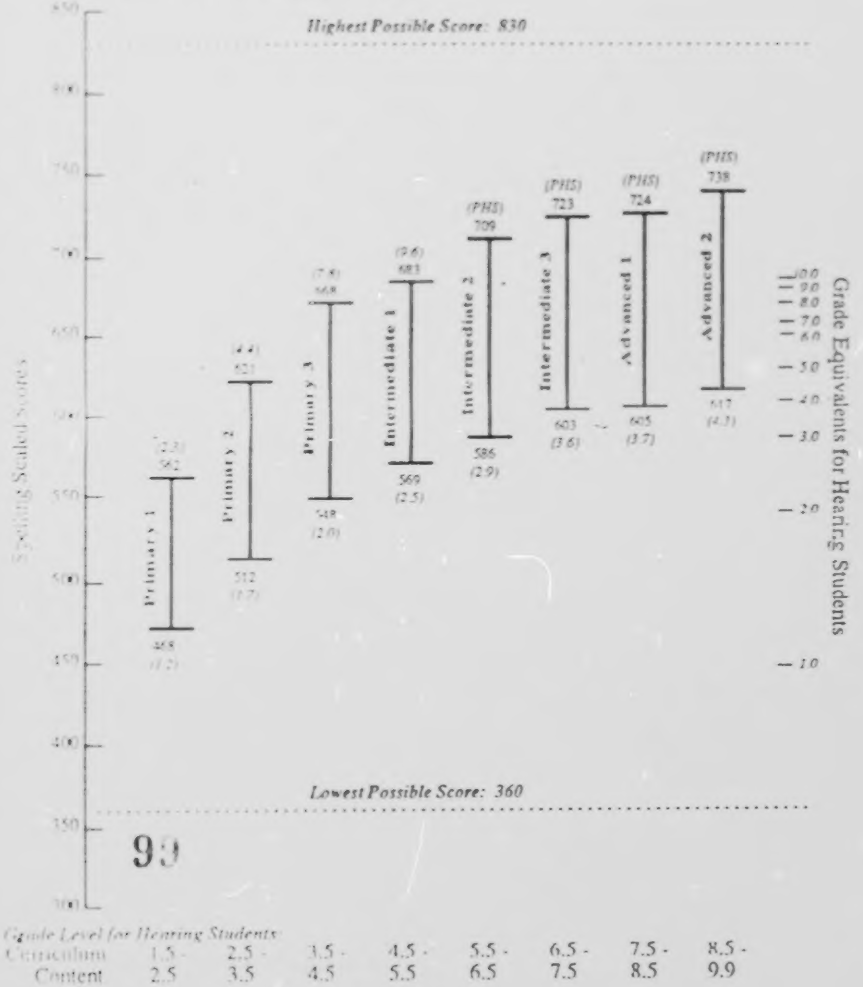


Figure 1.4.f. Total Language

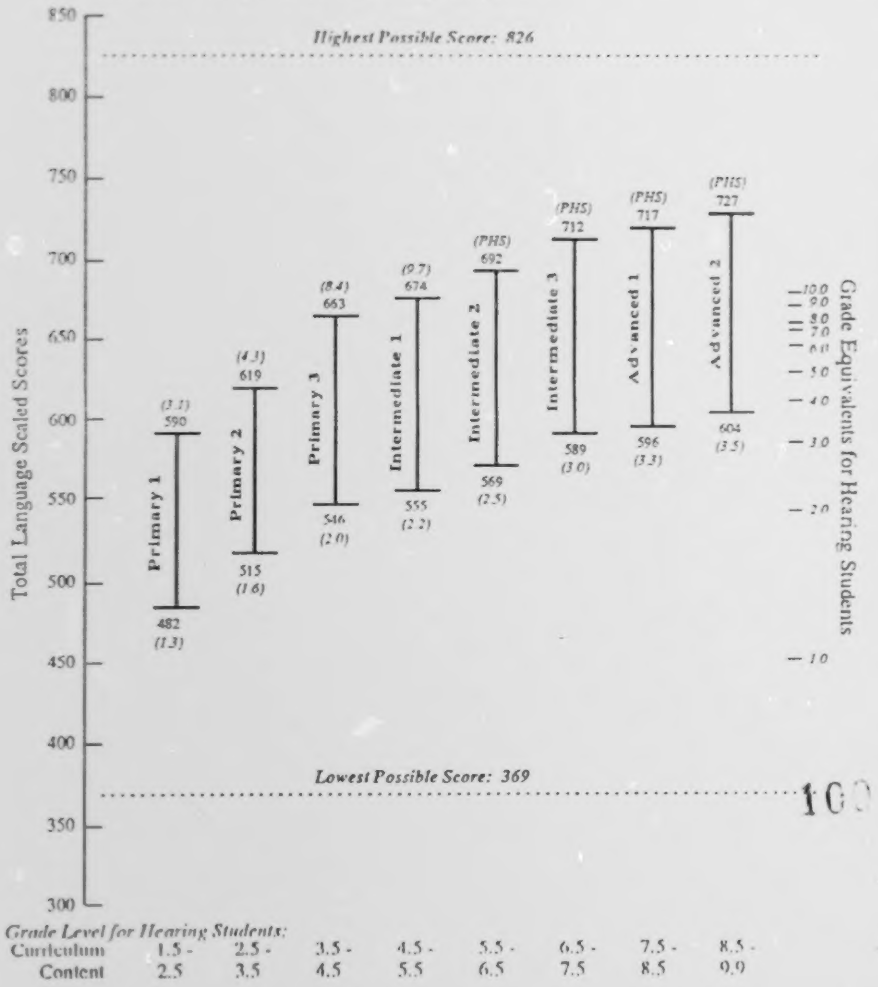


Table 1.7
Number of Students by Age and Test Level for the Reading Comprehension and Mathematics Computation Subtests Stanford Achievement Test, Spring, 1990

Test Level
Reading Comprehension

Age	P1	P2	P3	I1	I2	I3	A1	A2	*Total*
8	256	67	21						*344*
9	222	105	59	19	2			1	*408*
10	214	104	83	30	11	7	2	2	*453*
11	170	102	109	56	28	14	16		*495*
12	119	100	94	52	30	26	25	5	*451*
13	76	110	98	53	46	29	33	20	*465*
14	75	89	105	66	49	47	39	37	*507*
15	81	97	99	79	48	43	71	58	*576*
16	60	82	105	91	62	35	82	76	*593*
17	62	62	101	61	71	62	76	87	*582*
18	57	82	107	72	63	54	59	54	*548*
19-20	51	63	69	45	31	36	39	35	*369*
Total	*1443*	*1063*	*1050*	*624*	*441*	*353*	*442*	*375*	*5791*

Test Level
Mathematics Computation

Age	P1	P2	P3	I1	I2	I3	A1	A2	*Total*
8	189	127	28	3					*347*
9	116	155	96	28	1				*396*
10	81	143	119	69	20	1			*433*
11	49	111	130	101	53	20	6	1	*471*
12	32	81	78	86	81	54	21	11	*444*
13	23	37	89	83	75	67	37	41	*452*
14	11	43	59	78	74	103	55	66	*489*
15	21	29	61	64	69	88	92	132	*556*
16	4	24	33	66	77	97	86	182	*569*
17	9	16	35	43	76	78	114	193	*564*
18	11	22	38	55	63	75	109	168	*541*
19-20	7	8	38	49	48	56	56	125	*387*
Total	*553*	*796*	*804*	*725*	*637*	*639*	*576*	*919*	*5649*

Table 1.8
Mean Percent Correct Scores
Stanford Achievement Test, Spring, 1990

	Test Level							
Subtest	**P1**	**P2**	**P3**	**I1**	**I2**	**I3**	**A1**	**A2**
Reading Comprehension	46	44	47	51	54	51	55	66
Concepts of Number	48	53	49	52	47	49	49	61
Mathematics Computation	54	61	58	62	63	57	58	67
Mathematics Applications	51	55	50	53	53	51	57	64
Spelling	65	66	68	66	64	61	64	75
Total Language	49	56	57	62	59	56	55	63
Language Mechanics	Subtest does not appear at these levels		58	67	67	62	58	62
Language Expression			52	56	51	50	52	65
Study Skills	Subtest does not appear at these levels		58	61	65	59	62	69
Science			49	52	51	51	55	62
Social Science			50	48	51	51	58	65
Environment	50	61	Subtest does not appear at these levels					

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Internal Consistency Reliability

Internal consistency reliability, a measure of test homogeneity, was calculated for each of the subtests. The coefficient used was Cronbach's alpha, which is equivalent to KR-20 (Kuder-Richardson-20) for dichotomously scored (right/wrong) test items. These alpha reliability coefficients are shown in Table 2.1 for all subtests. The values for Cronbach's alpha are excellent for the subtests that appear at all eight levels: Reading Comprehension, Concepts of Number, Mathematics Computation, Mathematics Applications, Spelling, and Total Language. For these subtests, alpha ranged from .64 to .89 (with the majority of alpha values above .80). For the subtests that appear only at some levels, alpha was lower, ranging from .54 to .88.

Table 2.1 also summarizes additional useful information regarding each of the subtests: the number of students and number of test items per subtest, the mean and standard deviation of raw scores for the subtest, and the standard error of measurement for the subtest. A discussion of standard error is presented in the section, *Score Interpretation*.

Item Discrimination

Another measure of test quality is the index of item discrimination, which summarizes the relationship between the score on an individual item and the total test score. The index used to evaluate item discrimination with the Stanford is the corrected point biserial correlation. This statistic describes the relationship between a dichotomously scored item and the test score comprised of the remaining items.

For tests measuring a homogeneous set of skills or behaviors, items may be expected to have item discrimination indices that are positive and moderate in size. When a test contains items that do not discriminate (i.e., success on such items is not related to success on the remainder of the test), these items may be measuring something other than what the test as a whole measures. Some tests do not purport to measure a single domain. Because the subtests of the Stanford are constructed to measure achievement in specific areas, it is appropriate to consider item discrimination as a feature of test quality. Generally, items with corrected point biserial correlations of .2 or higher are considered to discriminate adequately.

Table 2.2 summarizes item discrimination for the SAT-8 subtests. For each subtest, the percentage of adequately discriminating items (i.e., those having corrected point biserial correlations above .2) is presented. Subtests vary in their homogeneity, with the mathematics-related subtests showing generally higher percentages of discriminating items than does Reading Comprehension. For subtests with lower percentages of discriminating items (indicating less homogeneity), examining scores in smaller clusters of items related to specific objectives may be more meaningful than interpreting scores for the entire subtest. (Center for Assessment and Demographic Studies, 1991b).

Validity

The validity of a test cannot be determined without reference to the uses for which it is being considered. A test has many validities, each dependent upon the specific purpose for which test scores are to be interpreted. Construct validity was examined for the SAT-8 to show the extent to which scores on the SAT-8 subtests reflect achievement in different subject areas.

Construct Validity

Construct validity evidence is presented in terms of correlations among scaled scores for several subtests; this validity evidence is based on multitrait-multimethod procedures developed by Campbell and Fiske (1959). The relative sizes of correlations are examined using this process to see whether expected patterns are obtained. Generally, subtests that are closely related in the trait (ability or content) measured, such as Mathematics Computation and Concepts of Number, may be expected to produce scores that are highly correlated. High correlations among separate tests that measure similar traits are demonstration of what Campbell and Fiske call "convergent validity." Subtests that differ substantially in the trait (ability or content) measured would be expected to have lower correlations among their scores, demonstrating "divergent validity." Patterns of higher and lower correlations among the subtests that vary in their similarity of content can be examined to provide evidence that supports the test's construct validity.

Table 2.3 shows these patterns of correlations. For this analysis, scaled scores on the six subtests given at all test levels were examined for three age groups: age 8-10, 11-14, and 15-18. First, the correlations for subtests measuring performance in highly related areas were examined. The mathematics-related subtests (Mathematics Computation and Concepts of Number) do indeed correlate highly with each other; for 11- to 14-year-olds the Pearson product-moment correlation coefficient is .86. Similarly, the reading-related subtests (Reading Comprehension, Language, and Spelling) show high correlations with each other: .91, .87, and .87. Second, the correlations among subtests measuring performance in moderately related areas were examined. Because Mathematics Applications relies on both mathematics and reading skill, correlations of this score with both mathematics- and reading-related subtests can be expected to be lower than the correlations within either mathematics or reading subtests alone. Mathematics Applications has correlations of .77 and .87 with the two mathematics-related subtests for this age group; it has correlations of .88, .88, and

Table 2.1
Sample Sizes, Means, Standard Deviations, Number of Items, Internal Consistency Alpha Reliability Coefficients, and Standard Errors of Measurement, Stanford Achievement Test, Spring, 1990

	Test Level							
Subtest	**P1**	**P2**	**P3**	**I1**	**I2**	**I3**	**A1**	**A2**
Reading Comprehension								
N	1443	1063	1050	624	441	353	442	375
Mean	18.4	17.6	25.5	27.7	29.1	27.4	29.6	35.5
SD	6.1	4.7	7.0	7.9	7.3	7.0	7.0	8.3
N. Items	40	40	54	54	54	54	54	54
Alpha	.79	.64	.78	.82	.80	.79	.80	.86
SEM	2.8	2.8	3.2	3.3	3.3	3.2	3.1	3.1
Concepts of Number								
N	657	802	748	713	542	588	552	890
Mean	16.5	17.9	16.5	17.5	16.0	16.7	16.8	20.9
SD	5.9	5.4	5.0	5.2	5.0	5.3	4.9	6.0
N. Items	34	34	34	34	34	34	34	34
Alpha	.81	.77	.72	.75	.72	.75	.71	.83
SEM	2.6	2.6	2.6	2.6	2.7	2.7	2.6	2.5
Mathematics Computation								
N	553	796	804	725	637	639	576	919
Mean	14.1	22.1	25.6	27.3	27.7	25.0	25.7	29.5
SD	5.9	6.0	7.7	7.3	7.6	7.3	7.2	8.1
N. Items	26	36	44	44	44	44	44	44
Alpha	.86	.83	.87	.85	.86	.85	.85	.89
SEM	2.2	2.5	2.8	2.8	2.8	2.9	2.8	2.7
Mathematics Applications								
N	1118	1014	898	579	436	348	386	375
Mean	15.3	19.3	18.8	21.2	21.0	20.2	22.7	25.7
SD	5.1	5.2	6.4	6.7	7.0	6.8	6.3	7.3
N. Items	30	35	38	40	40	40	40	40
Alpha	.79	.78	.82	.83	.85	.82	.79	.86
SEM	2.4	2.4	2.7	2.8	2.7	2.9	2.8	2.7
Spelling								
N	911	834	811	489	315	271	332	265
Mean	19.3	19.8	24.4	23.9	32.2	30.7	31.8	37.5
SD	5.2	4.5	5.5	5.3	7.4	7.6	7.6	8.2
N. Items	30	30	36	36	50	50	50	50
Alpha	.79	.74	.79	.77	.84	.84	.84	.89
SEM	2.4	2.3	2.5	2.5	3.0	3.1	3.0	2.7
Total Language								
N	1202	1047	962	598	399	326	408	340
Mean	21.4	24.5	34.1	37.1	35.7	33.5	32.8	37.9
SD	5.9	5.6	8.1	7.6	7.0	6.6	7.1	8.7
N. Items	44	44	60	60	60	60	60	60
Alpha	.71	.71	.81	.81	.77	.74	.76	.86
SEM	3.1	3.0	3.5	3.3	3.4	3.4	3.5	3.3

Table 2.1 con't.

	Test Level							
Subtest	**P1**	**P2**	**P3**	**I1**	**I2**	**I3**	**A1**	**A2**
Language Mechanics								
N	(Subtest		1038	590	387	328	415	342
Mean	does not		17.4	20.2	20.2	18.5	17.3	18.5
SD	appear at		4.2	3.8	3.5	3.6	3.6	4.3
N. Items	these		30	30	30	30	30	30
Alpha	levels)		.67	.64	.58	.56	.54	.70
SEM			2.4	2.3	2.2	2.4	2.5	2.4
Language Expression								
N	(Subtest		916	577	386	320	399	336
Mean	does not		15.7	16.8	15.4	14.9	15.6	19.5
SD	appear at		4.7	4.4	4.2	3.7	4.2	5.1
N. Items	these		30	30	30	30	30	30
Alpha	levels)		.71	.69	.63	.57	.66	.80
SEM			2.5	2.4	2.5	2.4	2.5	2.3
Study Skills								
N	(Subtest		803	426	269	243	266	214
Mean	does not		17.3	18.3	19.5	18.8	19.8	22.0
SD	appear at		4.9	4.6	4.0	4.5	4.4	4.6
N. Items	these		30	30	30	32	32	32
Alpha	levels)		.76	.74	.66	.69	.70	.76
SEM			2.4	2.4	2.3	2.5	2.4	2.3
Science								
N	(Subtest		718	478	298	249	289	251
Mean	does not		24.6	26.0	25.5	25.7	27.3	31.0
SD	appear at		6.3	5.8	6.3	5.6	5.7	6.4
N. Items	these		50	50	50	50	50	50
Alpha	levels)		.76	.70	.75	.68	.70	.77
SEM			3.1	3.2	3.2	3.2	3.1	3.1
Social Science								
N	(Subtest		771	502	307	257	304	267
Mean	does not		24.8	24.2	25.3	25.5	28.8	32.4
SD	appear at		6.5	7.3	6.2	6.2	6.5	8.6
N. Items	these		50	50	50	50	50	50
Alpha	levels)		.77	.82	.73	.74	.76	.88
SEM			3.1	3.1	3.2	3.2	3.2	3.0
Environment								
N	820	786	(Subtest does not appear at these levels)					
Mean	19.9	24.6						
SD	5.5	4.8						
N. Items	40	40						
Alpha	.72	.64						
SEM	2.9	2.9						

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Table 2.2
Percentage of Items with Corrected Point Biserial >.20
Stanford Achievement Test, Spring, 1990

	Test Level							
Subtest	**P1**	**P2**	**P3**	**I1**	**I2**	**I3**	**A1**	**A2**
Reading Comprehension	68%	35%	57%	70%	70%	57%	61%	81%
Concepts of Number	85%	74%	62%	74%	68%	76%	65%	94%
Mathematics Computation	92%	89%	86%	89%	91%	89%	82%	89%
Mathematics Applications	83%	71%	82%	75%	85%	73%	85%	98%
Spelling	77%	80%	75%	81%	80%	74%	74%	96%
Total Language	52%	48%	72%	68%	47%	37%	47%	73%
Language Mechanics	Subtest does not appear at these levels		57%	40%	37%	23%	30%	63%
Language Expression			60%	60%	50%	37%	47%	80%
Study Skills	Subtest does not appear at these levels		80%	77%	57%	47%	59%	75%
Science			50%	32%	56%	34%	32%	60%
Social Science			60%	78%	54%	48%	58%	88%
Environment	58%	35%	Subtest does not appear at these levels					

Table 2.3
Correlations of Scaled Scores Across all Test Levels (P1-A2)
Stanford Achievement Test, 8th Edition, Spring 1990

	Math-Related			Reading-Related		
Age 8-10	*Math Comp*	*Concepts of Number*	*Math App*	*Reading Comp*	*Total Language*	*Spelling*
Math Comp		a				
Concepts of Number	81					
Math App	*76*	*86*				
Reading Comp	67	78	*84*			
Total Language	66	78 c	*83*	88	b	
Spelling	70	78	*78*	86	84	
Age 11-14						
Math Comp						
Concepts of Number	86					
Math App	*77*	*87*				
Reading Comp	72	82	*88*			
Total Language	73	82	*88*	91		
Spelling	73	79	*82*	87	87	
Age 15-18						
Math Comp						
Concepts of Number	88					
Math App	*79*	*87*				
Reading Comp	70	79	*88*			
Total Language	73	80	*88*	90		
Spelling	70	77	*81*	87	88	

a - correlations among math-related subtests
b - correlations among reading-related subtests
c - correlations among math- and reading-related subtests

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.82 with the reading-related subtests. Third, the correlations among subtests measuring performance in minimally related areas were examined. Tests measuring different content areas would be expected to correlate least with each other. To illustrate, for 11- to 14-year-olds, the correlations of mathematics-related subtests with reading-related subtests are indeed lower: .72, .73, .73, .82, .82, and .79.

The pattern of correlations presented in Table 2.3 provides evidence supporting construct validity of the Stanford for the three age groups of deaf and hard of hearing students. In each row or column, the correlations are highest among the subtests conceptually more similar (the values shown in the triangles), and lowest among the dissimilar subtests (the values shown in the rectangles), while the correlations between Mathematics Applications and all other subtests (in bold type) are intermediate in size. The expected patterns of highest, medium, and lowest correlations among similar and dissimilar subtests are obtained.

It should be noted that all of these correlations are substantial, reflecting the nature of the test and its tasks. The SAT-8 measures academic achievement in several content areas, and it is clear that the students who score high in one content area also score high in others. Perhaps some of the similarity in test scores may be attributed to the use of the same general multiple choice testing method for all the subtests. Another factor that influences the size of the correlations is that of test score variability. In this analysis scaled scores are examined across eight test levels, allowing for great variability in scaled scores. By definition, greater score variability allows for higher correlation coefficients.

To allow the examination of construct validity for a variety of population subgroups, the correlations of scaled scores among the subtests grouped by similarity of curriculum content are summarized in Table 2.4.[2] The subtests included are those appearing at all eight SAT-8 test levels. The expected patterns of higher and lower correlations are obtained for all subgroups examined. Construct validity of these subtests for these subgroups is indicated.

Earlier Validity Studies

Although the validity analysis of the SAT-8 focused only on construct validity, it is appropriate to mention that the previous edition of the test (SAT-7), which was based on similar curricular objectives, had been examined in terms of criterion-related validity and content validity with deaf and hard of hearing examinees. Allen (1986b, p.13) reported that the SAT-7 was administered to a group of entering preparatory and freshmen students at Gallaudet College. The students' scores on the Stanford were found to be related to both grade point average and attrition after one semester. These findings support the criterion-related validity for the Stanford as a predictor of success at college.

Harnisch and Allen (unpublished, as reported in Allen, 1986b, pp. 13-15) conducted a study of the linkage between the Mathematics Computation and Reading Comprehension subtests of the SAT-7 and the curricula offered in special education programs serving deaf and hard of hearing students throughout the United States. In this study they asked teachers to estimate to what extent a targeted student had had an opportunity to learn the content of specific items or content categories and to predict whether the student would answer each item correctly. Harnisch and Allen determined that the level of coverage of mathematics objectives appearing on the SAT-7 was high and that performance on these objectives co-varied with coverage. In other words, coverage was generally good, and lower performance was usually associated with poorer curriculum coverage. They noted three qualifications to these findings: (1) the more difficult objectives appearing only at the upper levels of the test (including percent, estimation, proportions, and linear equations) were not as well covered as the objectives at the lower levels; (2) subtraction with renaming remained very difficult for deaf and hard of hearing students through the Primary 3 level, despite very high levels of coverage; (3) computation with fractions remained difficult at the upper levels of the test, despite moderately high levels of coverage.

Harnisch and Allen reported similar results for Reading Comprehension content categories. Coverage levels were fairly high throughout the six test levels of the SAT-7. They noted two exceptions: (1) the two-sentence story category appearing at Primary 1 (this category also appears at Primary 1 in the SAT-8) was not well covered in the curricula of the programs serving deaf and hard of hearing students, and students performed poorly on items representing this category; (2) inferential comprehension was less well covered for students at the Primary 3 and Intermediate 1 levels of the test than was literal comprehension. Performance on inferential comprehension items lagged behind the performance on literal comprehension items at each of the four upper levels of the SAT-7.

Threat to validity: Out-of-level testing

For an educational test to have content validity, there is a presupposition that the test's curriculum objectives are appropriate for the students taking the test. For deaf and hard of hearing students taking levels of the SAT-8 designed for younger hearing students, this presupposition must be examined carefully.

In interpreting test scores and other information from educational achievement tests, it is important to keep in mind the content and skills the test was designed to measure. The Stanford

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Table 2.4
Average Intercorrelations of Scaled Scores Among Construct Validity Groupings of Subtests for Population Subgroups, Stanford Achievement Test, Spring 1990

	Among Math Subtests	Among Reading Subtests	Math App. with Math & Reading Subtests	Math with Reading Subtests
Age				
8-10	81	86	81	73
11-14	86	88	84	77
15-18	88	88	85	75
19-20	89	88	84	73
Program Type				
Special Schools	91	91	87	81
Local Schools	90	90	87	82
Minimal or no integration	89	88	84	78
Integration	87	85	83	75
Hearing Loss				
Profound	91	91	88	82
Severe	91	91	88	81
Less-than-severe	89	88	87	81
Additional Handicap				
None	90	90	87	80
One or more	91	89	86	80
Race/ethnicity				
White, non-Hispanic	91	90	88	81
Black, non-Hispanic	90	89	86	83
Hispanic	90	90	86	80

Note: Correlations among the subtests given at all levels were considered: Reading Comprehension, Mathematics Computation, Concepts of Number, Mathematics Applications, Spelling, Total Language.

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Achievement Test was designed to measure the curriculum content and skills commonly taught nationally to hearing students in grades 1 through 9. Each of the eight test levels is associated with curricula specific to certain grade levels, and most hearing students are assigned the test level based on their grade in school. Hearing students taking a particular level are relatively more homogeneous in age than are their deaf and hard of hearing counterparts taking that same test level. As indicated in Figures 1.2 and 1.3, deaf and hard of hearing students are not assigned to test levels based on age, but may be assigned to any of the eight test levels in Reading Comprehension and Mathematics Computation.

Table 2.5 shows the grade levels and ages of hearing students for which each test level was designed, and the age ranges for deaf and hard of hearing students in the norming sample. The norming sample includes all students aged 8 through 20 who scored in the measurable range, as described earlier. It is clear that many students in the norming sample took tests designed for much younger hearing students. The target age and grade level of the test level must be taken into consideration during score interpretation for an individual student. It is important to consider whether the test content level was appropriate for the test taker. It is also important to keep in mind the distribution of test levels taken by the norm group of a given age when interpreting norm scores for a given student (see Table 1.7).

SECTION 3: SCORE INTERPRETATION

Percentile Rankings

A percentile rank allows a direct comparison between an individual's performance on a scored test and the performance of a group of peers. Specifically, the percentile rank for an individual student gives the percentage of the comparative peer group who have lower scores. Thus, if an individual receives a percentile ranking of 38, for example, it means that he or she performed at a level that was higher than 38% of the comparison group.

Obviously, the computation of percentile ranks is completely dependent on the sample of students who have taken the test as part of its standardization. Since deaf students were **explicitly excluded** from the standardization sample when the SAT-8 was normed on hearing students, it is clear that percentile rankings for deaf students based on comparisons to this group are inappropriate. In fact, the primary rationale for undertaking a national standardization of the SAT-8 with deaf and hard of hearing students was to examine the distributions of scores for this group and to compute percentile ranks based on these distributions.

For deaf and hard of hearing students, the comparison groups are based on age. As reported in Section 1, students at a particular age take all levels of the SAT-8, according to their performance on the screening procedures. Also, students who have taken a particular level of the SAT-8 vary considerably in age, as noted in Table 2.5. Therefore, the percentiles for deaf and hard of hearing students cannot be based on a single test level. For deaf and hard of hearing students, the percentiles are based on distributions of scaled scores by age and by subtest area. As described below, the scaled scores have been **equated** across test levels so that a given value is intended to represent approximately the same level of academic achievement in a subtest area, regardless of test level from which it was obtained. While there are limits to the validity of scores that have been equated across test levels, it is hoped that excluding individuals who did not score in the measurable range would result in scaled score distributions that represent valid rankings of students at each age for each of the subtest areas.

Deaf and hard of hearing students represent a very diverse group. Therefore, as a comparison group for individual test takers, they may be limited. For example, a sample that has a large number of hard of hearing students in it may not be completely appropriate as a comparison group for a profoundly deaf student. For this reason, two sets of percentiles have been computed for the deaf and hard of hearing sample. The first set is computed for the entire SAT-8 deaf and hard of hearing norming sample; the second is computed only for those in the sample whose level of hearing loss was in the severe-to-profound range. These allow educators to get percentile rankings for their students using appropriate comparisons.

Percentile ranks for deaf and hard of hearing students are not available for all subtests. CADS has divided the SAT-8 into three categories of appropriateness for deaf and hard of hearing students (Center for Assessment and Demographic Studies, 1989). These three categories and the levels at which the subtests appear are presented in Table 3.1. Percentile ranks for those subtests considered most appropriate for deaf and hard of hearing students (Category 1) are based on the entire norming sample. Percentile ranks for those subtests that are curriculum-dependent and therefore may not be appropriate for many deaf and hard of hearing students (Category 2) are based on samples of students from programs who opted to administer these tests. Thus, they do not reflect the performance of the entire norming sample. Percentile ranks for subtests considered not appropriate (Category 3) have not been computed.

When interpreting percentiles, it is important to consider whether the subtest area is offered at all eight levels of the SAT-8. Since percentiles are based on students taking all available levels of the SAT-8, those calculated on subtest areas that do not appear at all levels should be interpreted very

Table 2.5
Test Levels with Content Level and Age for Hearing Students, and Age of Deaf and Hard of Hearing Norming Sample Stanford Achievement Test, Spring 1990

	Grade Level of Test Content	Age of Hearing Students	Age of Deaf and Hard of Hearing Norming Sample
Primary 1	1.5 - 2.5	6 - 8	8 - 20
Primary 2	2.5 - 3.5	7 - 9	8 - 20
Primary 3	3.5 - 4.5	8 - 10	8 - 20
Intermediate 1	4.5 - 5.5	9 - 11	8 - 20
Intermediate 2	5.5 - 6.5	10 - 12	9 - 20
Intermediate 3	6.5 - 7.5	11 - 13	10 - 20
Advanced 1	7.5 - 8.5	12 - 14	10 - 20
Advanced 2	8.5 - 9.9	13 - 15	9 - 20

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Table 3.1
Categories of Subtests and Corresponding Levels

Test Appropriateness Category/Subtest	SAT-8 Levels
Category 1[*]:	
Word Reading	P1
Reading Comprehension	All levels
Concepts of Number	All levels
Mathematics Computation	All levels
Spelling	All levels
Language	All levels
Study Skills	P3 - A2
Category 2[†]:	
Environment	P1 and P2
Mathematics Applications	All levels
Science	P3 - A2
Social Science	P3 - A2
Category 3[‡]:	
Listening	All levels
Word Study Skills	P1 - P3
Reading Vocabulary	P2 - A2

[*] Category 1 subtests are appropriate for most deaf and hard of hearing students and are recommended.

[†] Category 2 subtests are appropriate for only some deaf and hard of hearing students because they are closely tied to curricula.

[‡] Category 3 subtests are appropriate for only a few deaf and hard of hearing students due to their reliance on auditory experience and also to their low reliability when used with many deaf and hard of hearing students.

cautiously. Since, for example, Science appears only at the Primary 3 through Advanced 2 levels of the SAT-8, students assigned to the Primary 1 and Primary 2 levels of the SAT-8 were not included. Therefore, the distribution of Science scaled scores for students of a particular age does not include some of the lower achieving students, and the resulting percentiles must be interpreted with that fact in mind.

Grade Equivalents

A grade equivalent (GE) score is designed to convey the meaning of test performance in terms of what is typical of a student at a given grade level. GEs are expressed as the grade plus the month (or tenth of grade) of the school year. They can be used to compare the achievement of deaf and hard of hearing students with hearing students who took that test level. For the SAT-8, they were computed for the general population of hearing students who are automatically assigned to test levels based on their grade in school. The calculation of GEs is based on the assumption that the curriculum level of the test matches that of the classroom.

Each GE is associated with a scaled score, which represents the median level of performance demonstrated by students at that grade level. A GE can be calculated from observed data only when the test is actually administered to students at that grade level. Although GEs for other grade levels can be obtained by mathematical extrapolation, they represent mere conjecture because they are not based on observed data. Thus, GEs beyond the grade levels for which the test is designed are meaningless (Angoff, 1984, pp. 22-25). For example, as indicated in Table 2.5, the Primary 3 test was designed for students in the third and fourth grades. Therefore, GEs below third grade or above fourth grade for students taking this level of the test should be regarded only as indicators of the student's standing relative to the test level. GEs below third grade on the Primary 3 test would indicate only that the student scored below the level of the curriculum content measured by the test. It would be meaningless to try to differentiate a 2.1 from a 2.6 GE. Similarly, GEs above fourth grade would indicate only that the student scored above the curriculum level of the test. Differentiating between a GE of 6.8 and post high school (PHS) would be fruitless. Specific GEs are meaningful only within the grade range for which a test is designed.

GEs do not represent equal units on a continuous scale. As illustrated in Figure 1.4, the GE intervals are largest for the lowest scaled scores and become progressively smaller as the scaled scores increase. For example, the grade equivalent interval from 1.0 to 2.0 for the Reading Comprehension subtest (Figure 1.4.a) represents more than 100 scaled score points, while the interval from 7.0 to 8.0 represents only 10 scaled score points. Another way to view the unequal intervals of GEs is to examine the different levels of a subtest. For example, the Intermediate 1 level of the Reading Comprehension subtest (Figure 1.4.a) encompasses a scaled score interval of 123 points and a GE range from 1.2 to 10.1. The Intermediate 2 level of the same subtest encompasses a scaled score interval of 122 points, but has a GE range from 2.6 to post high school. In this example, moving up only one level of the subtest increases the range of the GEs by more than two years, although the scaled score intervals are of nearly identical width.

When interpreting GEs for deaf and hard of hearing students, it is important to remember that those GEs represent curriculum levels for hearing students. Curriculum levels may differ for deaf and hard of hearing students. In addition, out-of-level testing of deaf and hard of hearing students further increases the likelihood of making an inappropriate grade level comparison.

Scaled Scores

Unlike GEs, scaled scores represent approximately equal units on a continuous scale, linking different levels of a subtest area. For example, levels Primary 1 through Advanced 2 of the Reading Comprehension subtest are linked on one common scale. Although the numerical values themselves are arbitrary (ranging from approximately 350 to 850 on the SAT-8), they have several advantages over GEs. One advantage is that they link the levels of the test on a common scale. This allows the measurement of a student's growth within a particular subject area.

Since scaled scores represent equal intervals, they may be averaged to summarize the performance of a group. However, scores may be combined only **within the same subtest**. Scores from different subtests may not be combined because each subtest has a separate unique scale. For example, a scaled score of 500 on a Mathematics Computation subtest is not comparable to a score of 500 on a Concepts of Number subtest. Therefore, scores on different subtests may not be averaged for a group or for an individual.

Scaled scores on the SAT-8 may also be compared with scores from the same subtest of the Stanford Achievement Test, 7th Edition. However, 7th Edition scaled scores must first be converted to the 8th Edition scale (The Psychological Corporation, 1989a).

Standard Error of Measurement

No score is completely accurate. All reported scores should be interpreted as representing a score range. The standard error of measurement (SEM) allows the construction of an interval around an observed score within which it can be fairly certain the true score lies. The width of this confidence interval is directly related to the reliability of the test--the higher the reliability the narrower the

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interval and the more precise the measure. Thus, the SEM presents a clearer picture of the accuracy of measures than does the reliability coefficient alone.

The SEMs for the SAT-8 are given in Table 2.1. These are expressed in terms of raw score points for each of the subtests at all eight levels. It is possible to construct confidence intervals around test scores to provide a sense of certainty about the scores. To construct an interval within which it can be 68% certain that an individual's true score will fall, add and subtract one SEM to and from the observed raw score. To construct an interval within which it can be 95% certain that the true score will fall, add and subtract two SEMs to and from the raw score. After the raw score interval has been calculated, it can then be converted to a scaled score interval by looking up in a table (Center for Assessment and Demographic Studies, 1991a; The Psychological Corporation, 1989c) the low raw score defining the bottom of the interval and the high raw score defining the top of the interval.

To illustrate this procedure, 63% and 95% confidence intervals for the eight levels of the Reading Comprehension subtest have been calculated, then converted to scaled score intervals. These scaled score intervals for a variety of percent-correct scores are presented in Figure 3.1 for the Reading Comprehension subtest and in Figure 3.2 for the Mathematics Computation subtest.

The procedure used for calculating confidence intervals will now be demonstrated in an example using the Primary 3 Reading Comprehension subtest (shown in Figure 3.1). Table 2.1 is used to find that the SEM equals 3.2 for Primary 3 Reading Comprehension. A 68% confidence interval is therefore calculated by adding and subtracting 3.2 raw score points to and from the observed raw score. A student who correctly answered 50% of the items in this 54-item test would receive a raw score of 27 and a scaled score of 590. The 68% interval around this raw score ranges from 24 (27 minus 3.2) to 30 (27 plus 3.2). When these raw scores are then converted to scaled scores, the resulting interval ranges from 581 (the scaled score associated with a raw score of 24) to 599 (the scaled score associated with a raw score of 30). This is a width of 19 scaled score points, within which it can be 68% certain that an individual's true score falls. In contrast, a student who correctly answered 90% of the items would receive a raw score of 49 with a 68% confidence interval ranging from 46 to 52, converting to a scaled score interval of 658 to 713 (a width of 56 scaled score points). In addition, a student who correctly answered only 10% of the items would receive a raw score of 5 with a 68% confidence interval ranging from 2 to 8, converting to a scaled score interval of 464 to 520 (a width of 57 scaled score points). Thus, the scores representing 90% correct and 10% correct (both outside the measurable range) are much less precise than the score representing 50% correct. The confidence interval in Figure 3.1, is narrower around 50% correct, illustrating the greater measurement precision.

The greater inaccuracy of scores outside the measurable range is also evident when a 95% confidence interval for this test is considered. It is calculated by adding and subtracting two SEMs to and from the observed raw score. Two SEMs equal 6.4 raw score points for the Primary 3 Reading Comprehension subtest. For the student who answered 50% correctly on that test, the raw score interval is 21 to 33 (27 plus and minus 6.4). This converts to a scaled score interval of 571 to 608 (a width of 38 scaled score points).

The interval for the raw score representing 90% correct would be 43 to 55 (49 plus and minus 6.4). However, the subtest contains only 54 items so that the upper end of the raw score interval is truncated at 54. The student has hit the "ceiling" of the test. This truncated raw score interval converts to a scaled score interval ranging from 644 to 761 (a width of 118 scaled score points). If the test contained more items, the confidence interval would be even wider.

The raw score interval representing 10% correct would be -1 to 11 (5 plus and minus 6.4). Since a raw score below 1 has no associated scaled score, the lower end of the raw score interval is truncated at 1. The student has hit the "floor" of the test. The truncated raw score interval converts to a scaled score interval ranging from 438 to 535 (a width of 98 scaled score points). If a lower score had been possible, the confidence interval would have been even wider.

It is illustrated in both Figures 3.1 and 3.2 that scores obtained by answering nearly all or almost none of the items correctly are generally associated with greater measurement error and less accurate score estimation. This is indicated by a lengthening of the confidence intervals as scores become more extreme. In general, the length of the confidence intervals is constant for scores between 30 and 70%. Scores representing correct answers for approximately one half of the items result in the most accurate measurement.

Measuring Growth

The SEM also serves an important function in determining the statistical significance of gains noted in scores from year to year. To show that a student has made a significant gain in achievement, both scores must be considered in terms of their confidence intervals. If the interval for the later score is lower than or overlaps the interval for the earlier score, it is not possible to say that there has been significant growth. The use of SEM to examine growth is demonstrated in three examples using a 68% confidence interval with the Reading Comprehension subtest. In the first two examples, growth cannot be observed because one of the test scores was outside the measurable range. The third

Figure 3.1
Confidence Intervals for All Levels of the Reading Comprehension Subtests
Stanford Achievement Test, Spring, 1990

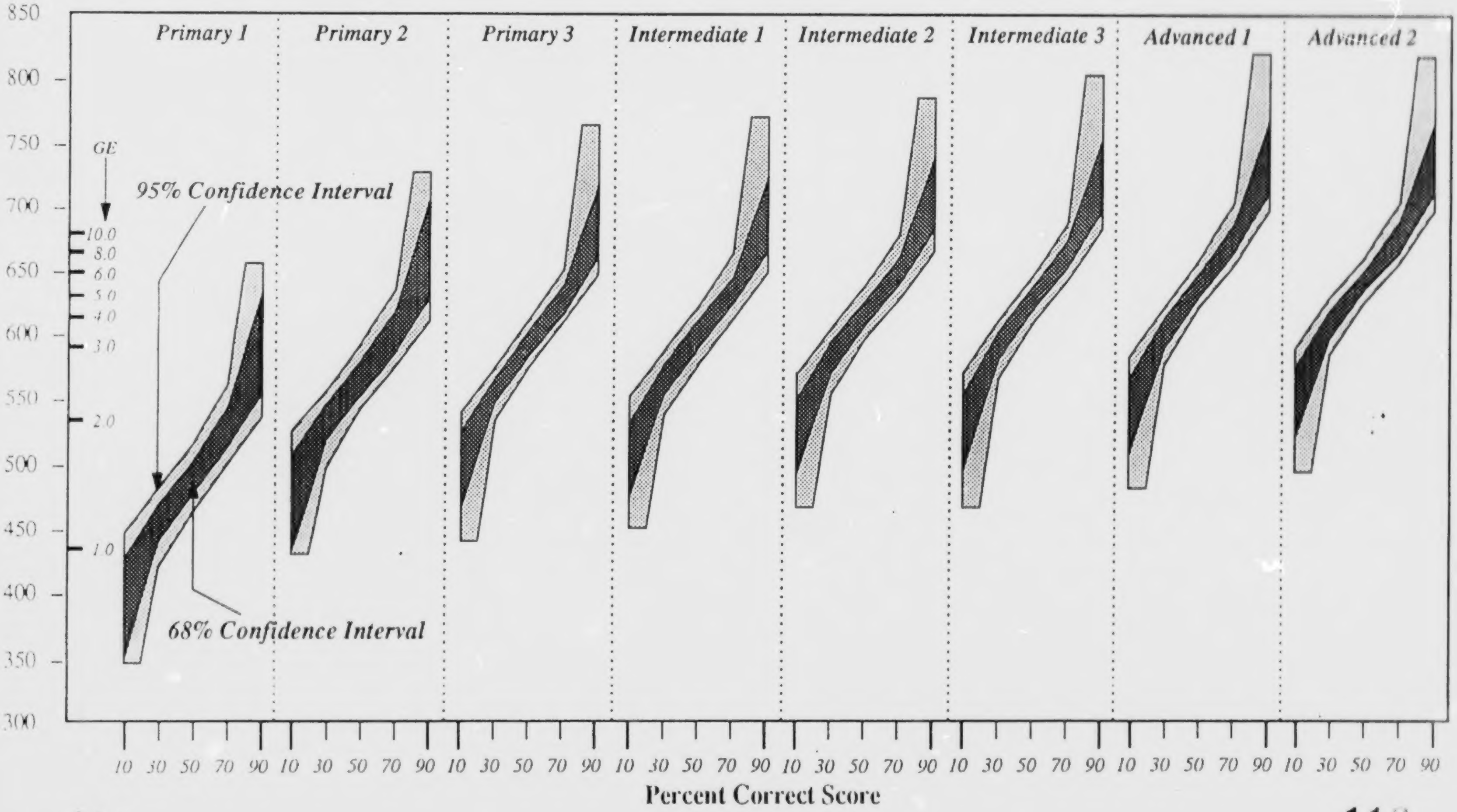
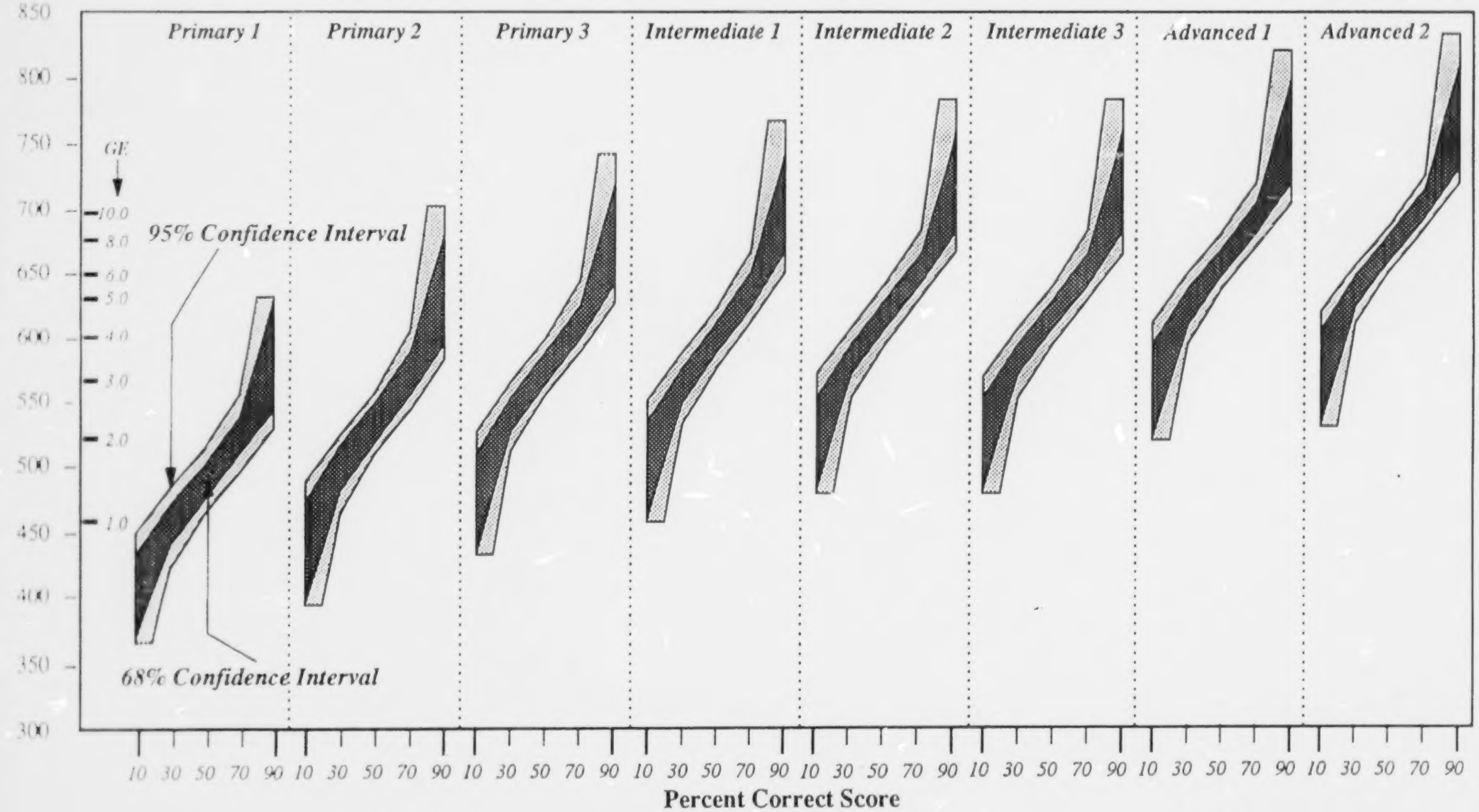


Figure 3.2
Confidence Intervals for All Levels of the Mathematics Computation Subtests
Stanford Achievement Test, Spring, 1990



example demonstrates a consistent pattern of growth over several test levels. These examples are each illustrated in Figure 3.3.

Example 1. In the first example, a student has an observed scaled score of 678 (representing 90% of the items correct) on the Primary 3 test. The 68% confidence interval for this score ranges from 658 to 713. That same student took the Advanced 1 level in a later year and scored 639 (representing 50% of the items correct). The 68% confidence interval for this score ranges from 630 to 649. The confidence interval for the Advanced 1 test is below the interval for the Primary 3 test. In this example, a too-easy test was taken at the Primary 3 level. The result is that in subsequent years it is not possible to show growth with a reasonable score on the Advanced 1 level. The curriculum levels of the two tests in this example are four years apart. This is a large difference; yet, it is not possible to show growth with 68% confidence because the Primary 3 score is outside the measurable range of the test.

Example 2. In the second example, a student has an observed scaled score of 590 (representing 50% of the items correct) on the Primary 3 test. The 68% confidence interval for this score ranges from 581 to 599. That same student took the Advanced 1 level in a later year and scored 545 (representing 10% of the items correct). The 68% confidence interval for this score ranges from 508 to 566. The confidence interval for the Advanced 1 test is lower than the interval for the Primary 3 test. In this example, the student took a too-difficult test at the Advanced 1 level and scored in the guessing range. The result is that it is not possible to show growth with 68% confidence, although the curriculum levels of the two tests are fours years apart, because the Advanced 1 score is outside the measurable range of the test.

Example 3. In the third example, a student over a period of years has obtained observed scaled scores representing 50% correct on each of four tests: 490 on Primary 1, 590 on Primary 3, 617 on Intermediate 2, and 639 on Advanced 1. These scores have 68% confidence intervals ranging from 477 to 502 for Primary 1, 581 to 599 for Primary 3, 608 to 626 for Intermediate 2, and 630 to 649 for Advanced 1. These four tests are each two years apart in curriculum level, representing a pattern that would occur if a student making consistent progress were tested every two years. As illustrated in Figure 3.3, none of the intervals for these four tests overlap. Therefore, it is possible to state with 68% confidence that significant growth has occurred between each of these test administrations.

Research has shown that for both hearing and deaf and hard of hearing students, it is very difficult to detect growth over one year's time. Tests simply do not measure accurately enough to do that. When you take into consideration the inaccuracy inherent in any test score, you must be able to demonstrate a considerable amount of growth for it to be statistically significant (not attributable to chance). **To detect growth in achievement, it is advisable to use scores from tests that were given more than one year apart.**

SECTION 4: SPECIAL NORMS TABLES

Description of Special Norms

The population of deaf and hard of hearing students in the United States is heterogeneous with respect to various demographic, audiological, and educational characteristics. This heterogeneity can lead to misconceptions in interpreting the percentiles of individual students. For example, if a particular student has cognitive handicaps in addition to hearing impairment, it may not be useful to apply the percentiles that are based on the entire population of deaf and hard of hearing students. Since an individual student may belong to more than one relevant group, it is also appropriate at times to apply more than one set of group norms when interpreting the scores (e.g., handicap status norms, ethnic group norms, and program type norms).

To permit more relevant comparisons, special norms tables have been prepared. These tables show scaled score distributions at each age level for various Stanford subtests for students with specific characteristics. Table 4.1 lists the groups for which special norms are provided.

The scaled score distributions for these groups are shown in two ways. First, a series of tables is provided containing the means and standard deviations of the scaled scores at each age level for various Stanford subtests within each group. Then, a series of decile tables is provided for these same groups.

Deciles are provided instead of percentiles because of the small number of students in some groups. The calculation of individual percentile ranks would have required larger samples. Deciles divide distributions into 10 equal parts, while percentiles divide distributions into 100 equal parts. Thus, scorers in the first through tenth percentiles are in the first decile, scorers in the eleventh through twentieth percentiles are in the second decile, etc.

To use the tables to compute a special norm for an individual student, it is necessary to know the student's age, the SAT-8 scaled score, and the group with which an appropriate achievement comparison is to be made. Norms are based on scaled scores, which link all levels of a subtest on a common scale. Therefore, it is not necessary to know the test level to obtain a special norm. An example will help explain how the special norms tables can be used. Suppose a 12-year-old student had a scaled score of 623 on the SAT-8 Concepts of Number subtest. Use of the

Figure 3.3
Examples Using SEM to Measure Growth

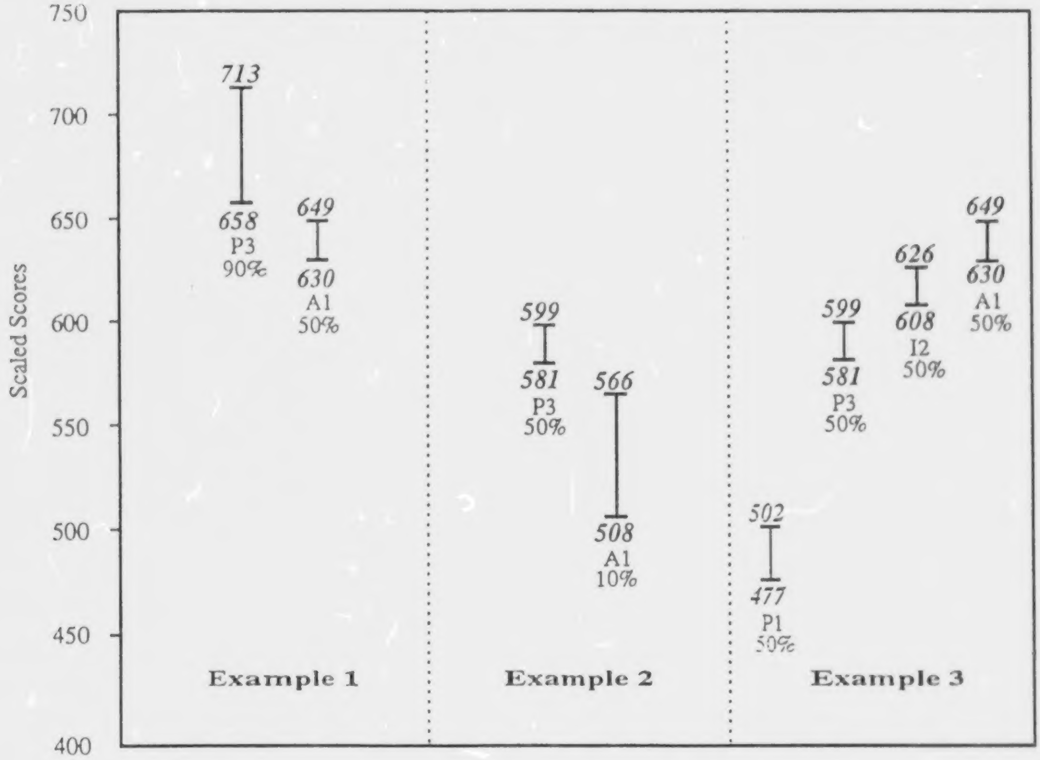


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Table 4.1
Subgroups of Students for Which Norms are Provided

- Students in special schools for deaf students
- Students in local schools, minimal or no integration with hearing students
- Students in local schools, integrated with hearing students

- Students with profound hearing loss
- Students with severe hearing loss
- Students with less-than-severe hearing loss

- Students with no reported educationally relevant handicap(s) in addition to hearing impairment
- Students with reported educationally relevant handicap(s) in addition to hearing impairment

- White non-Hispanic students
- Black non-Hispanic students
- Hispanic students

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overall deaf and hard of hearing student norms would reveal that the student scored at the 62nd percentile. However, a teacher of this student might feel that the 62nd percentile, which is in the 7th decile, is not a fair measurement since the student has additional cognitive handicapping conditions. The special decile norms tables show that this score is in the 8th decile for 12-year-old students who have additional cognitive handicapping conditions. Additional information is given for this student in the table of means and standard deviations. This table shows that the scaled scores on this subtest for this group have a mean of 558.6 and a standard deviation of 65.5. Thus, the student in this example scored one standard deviation above the mean for this comparison group of 12-year-old students with additional cognitive handicapping conditions.

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APPENDIX

List of Participating Programs, Stanford Norming Project, 1990

Arizona
Arizona School for the Deaf and Blind
Scottsdale Unified School District
Tempe Hearing Impaired Program

California
Alhambra School District
California School for the Deaf (Fremont)
Covina Valley Unified School District
El Dorado County
Fresno Unified School District
Marlton School (Los Angeles)
Nightingale Righetti High School (Santa Maria)
Orange County Hearing Impaired Program
Santa Clara Unified School District
Selaco High School (Downey)

Colorado
Adams County District #12
Colorado School for the Deaf and Blind
Jefferson County Public Schools

Connecticut
American School for the Deaf
East Hartford Public Schools

Delaware
Margaret S. Sterck School for the Hearing Impaired

District of Columbia
Kendall Demonstration Elementary School
Model Secondary School for the Deaf

Florida
Escambia County Schools
Florida School for the Deaf and the Blind
Leon County Schools

Okaloosa County Schools
Orange County Public Schools
Pinellas County Schools

Georgia
Atlanta Area School for the Deaf
Clayton County Schools
Dekalb County Schools

Illinois
A. G. Bell School (Chicago)
Dupage-West Cook Regional Special Education Association
Hale Elementary School (Chicago)
Illinois School for the Deaf
Kinzie Hearing Impaired Program (Chicago)
Mid-Central Regional Special Education Association
Whitney Young High School (Chicago)

Indiana
Lebanon Hearing Impaired Program
Northwest Indiana Special Education Cooperative

Iowa
Arrowhead Area Education Agency

Kansas
Kansas School for the Deaf
Shawnee County Special Education Cooperative
Wichita Public Schools

Kentucky
Jefferson County Public Schools

Louisiana
Ascension Parish Schools
Caddo Parish Schools
Chinchuba Institute for the Deaf
East Baton Rouge Parish Schools

Maryland
Montgomery County Public

Schools

Massachusetts

Mattacheese Middle School (West Yarmouth)
Worcester Public Schools

Michigan
Battle Creek Public Schools
Bay Arenac Intermediate School District
Bloomfield Hills Schools
Coor Intermediate School District
Mecosta-Osceola Intermediate School District
Shiawassee Intermediate School District
Traverse Bay Intermediate School District

Minnesota
Hennepin Technical Centers

Missouri
Kansas City School District
Missouri School for the Deaf

Montana
Montana School for the Deaf and Blind

New Hampshire
Manchester Program for the Hearing Impaired

New Jersey
Bruce Street School for the Deaf (Newark)
Marie H. Katzenbach School for the Deaf
Public School #27 (Jersey City)

New Mexico
New Mexico School for the Deaf

New York
Albany, Schoharie, Schenectady BOCES
Cleary School for the Deaf (Ronkonkoma)
Monroe County BOCES
New York State School for the Deaf (Rome)
New York State School for the Deaf (White Plains)
St. Mary's School for the Deaf (Buffalo)

North Carolina
North Carolina School for the Deaf

Ohio
Dayton Public Schools
Mayfield Auditory-Oral Program (Highland Heights)
St. Rita School for the Deaf (Cincinnati)
Steubenville City Schools
Toledo Public Schools
Wickliffe Total Communication

Program (Kirtland)

Oregon
Columbia Regional Program for the Hearing Impaired (Portland)
Oregon School for the Deaf
South Oregon Regional Program for the Hearing Impaired (Medford)

Pennsylvania
Allegheny Intermediate Unit #3
Intermediate Unit #1 (California)
Lancaster-Lebanon Intermediate Unit #13
Archbishop Ryan Memorial Institute for the Deaf (Philadelphia)
Scranton State School for the Deaf

South Carolina
Anderson School District #5
Greenville County School District
Spartanburg County School District

Tennessee
Memphis City Schools

Texas
Arlington Regional Day School Program for the Deaf

Brownsville Regional Day School Program for the Deaf
Crowley Regional Day School Program for the Deaf
East Harris County Cooperative
Houston Independent School District
Kerr-Bandera Regional Day School Program for the Deaf
Mesquite Regional Day School Program for the Deaf
Northeast Independent School District (San Antonio)
San Antonio Regional Day School Program for the Deaf

Virginia
Chesterfield County Public Schools

Washington
Highline Hearing Impaired Program (Seattle)

Wisconsin
Wisconsin School for the Deaf

APPENDIX C

SAT-8 SUPPLEMENTAL ADMINISTRATION MANUAL

Administering the 8th Edition

STANFORD

Achievement Test
to
Hearing Impaired Students

Please review these instructions carefully BEFORE reading the regular "Directions for Administering" booklets and then again AFTER doing so.

Center for Assessment and Demographic Studies
Gallaudet Research Institute
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Washington, D.C. 20002

1989

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The Center for Assessment and Demographic Studies wishes to acknowledge the generous cooperation of The Psychological Corporation, publisher of the Stanford Achievement Test, in the 1990 norming project for hearing impaired students.

ADMINISTERING THE 8th EDITION STANFORD ACHIEVEMENT TEST TO HEARING IMPAIRED STUDENTS

The 8th Edition Stanford Achievement Test (SAT-8) was published by the Psychological Corporation in 1988. Special procedures for using the Stanford with hearing impaired students have been developed in conjunction with the 1990 norming of the Stanford with a national sample of hearing impaired students. These procedures are described in this booklet.

This informational booklet reviews the special procedures which are necessary to ensure that hearing impaired students are tested as fairly as possible. It is not meant to replace the regular teacher directions which accompany each level of the test. Its intention is to alert you to special considerations in using the Stanford with hearing impaired students and to offer suggestions for administering the test.

It is your responsibility, as an administrator of the Stanford to hearing impaired students, to study carefully both the *Directions for Administering* the Stanford, which come with each level of the test, and the procedures suggested in this booklet. In developing these procedures, we have tried to make the Stanford a more individualized test. Much of the responsibility for this individualization must be assumed by the person administering the tests. Therefore, we strongly recommend that you allow extra time to study all materials carefully before you begin administering the tests to your students.

Two preliminary notes are in order:

- The term *hearing impaired* is generally used throughout this booklet to refer to both deaf and hard of hearing students. The sample of hearing impaired students selected for the norming project includes both deaf and hard of hearing students, of which a majority are deaf, i.e., severely to profoundly hearing impaired.
- The SAT-8 is not suitable for many hearing impaired children under age 7.

The Stanford Achievement Test, including test booklets, answer sheets, and teacher manuals, has been supplied by the Psychological Corporation, the test publisher. No test or answer sheet has been altered in any way from those given hearing students. This booklet is to be used together with the regular SAT-8 tests, answer documents, and administrators' manuals when giving the test to hearing impaired students. Although both hearing impaired and hearing students take identical SAT-8 tests, some procedures are different for hearing impaired students. For example, hearing impaired students take two short screening tests -- one in reading and one in mathematics -- to determine which of the eight difficulty levels of the SAT-8 should be assigned. Hearing students do not take screening tests; they are assigned on the basis of their grade in school.

The most important consideration when administering the Stanford to hearing impaired students is that of adequately communicating the test items and directions. By studying the test and preparing an approach to communication which is appropriate to the content area being tested and compatible with the mode of communication ordinarily utilized in instruction, you can best communicate the test items and directions to your hearing impaired students.

THE 1990 STANFORD NORMING PROJECT

The programs participating in the 1990 norming project were selected from among the programs which participate in the Annual Survey of Hearing Impaired Children and Youth, conducted by the Gallaudet Research Institute's Center for Assessment and Demographic Studies

(CADS). The sample is representative of the population of hearing impaired students receiving special education services throughout the United States. The norms developed in this project will allow you to compare the academic performance of your students in certain subject areas to both hearing and hearing impaired students across the United States.

THE STANFORD ACHIEVEMENT TEST (SAT-8)

The SAT-8 measures a student's level of academic achievement in a wide range of content areas. It is published in eight difficulty levels (unlike the 7th edition which had only six levels), and in two forms (J and K). Each level has been written to cover curriculum material that is specifically related to different grade levels in educational programs for hearing students throughout the United States. As recommended by the publishers, the test level/grade level correspondence is as follows:

Primary 1:	1.5 to 2.5
Primary 2:	2.5 to 3.5
Primary 3:	3.5 to 4.5
Intermediate 1:	4.5 to 5.5
Intermediate 2:	5.5 to 6.5
Intermediate 3:	6.5 to 7.5
Advanced 1:	7.5 to 8.5
Advanced 2:	8.5 to 9.9

The SAT-8 is a norm-referenced test, which means that the scores derived from your students' responses to the test can be compared with the scores of a representative norming population. The Psychological Corporation has standardized this test with a large national sample of hearing students. The CADS norming project extends the work of the Psychological Corporation by allowing comparisons with hearing impaired students as well. Teachers of hearing impaired students and school administrators should recognize that their comparison of hearing impaired students to hearing students often involves a comparison of older hearing impaired students to younger hearing students.

PRETEST CONSIDERATIONS

Not all of the Stanford subtests should be given to every hearing impaired student. Experience with previous editions of the Stanford has shown that some subtests are not appropriate for many hearing impaired students. The subtests in the Stanford fall into three categories of appropriateness.

Category 1

Those which are appropriate for most hearing impaired students and are recommended:

Word Reading	P1
Reading Comprehension	All levels
Concepts of Number	All levels
Mathematics Computation	All levels
Spelling	All levels
Language	All levels
Study Skills	P3 - A2

Category 2

Those which are appropriate for only some hearing impaired students because they are closely tied to curricula:

Environment	P1 and P2
Mathematics Applications	All levels
Science	P3 - A2
Social Science	P3 - A2

Category 3

Those which are appropriate for only a few hearing impaired students due to their reliance on auditory experience and also to their low reliability when used with many hearing impaired students:

Listening	All levels
Word Study Skills	P1 - P3
Reading Vocabulary	P2 - A2

For Categories 2 and 3, consider the curriculum of your individual program and study the items on the test before you decide whether or not to administer these subtests.

MULTIHANDICAPPED STUDENTS

A question often arises about whether to test multihandicapped students. Our response to this question has been: if the student is able to take a test which will give helpful information to the student, to the student's family, or to the school, then the student should be tested.

TEST LEVEL ASSIGNMENT

As indicated earlier, assignment of the proper level of the SAT-8 for each student should be made on the basis of two brief screening tests: one in reading and one in mathematics. These screening tests are available for each level of the SAT-8, Primary 1 through Advanced 2. How do you decide which screening test to administer to an individual hearing impaired student? The following steps will assist you in selecting a screening test for each student:

(1) review a sample set of screening tests in reading or mathematics and the *Instructional Objectives* booklet which describes the kinds of items in the screening tests and indicates what percentage of these items are included in the complete battery subtests;

(2) on the basis of knowledge of the student's abilities, assign the screening test level at which the student can be expected to answer approximately 50% to 70% of the screening test items correctly; assign one level for reading and one level for mathematics (for an individual student, the two screening tests may be at the same level or at different levels).

(3) after administering and scoring the screening tests according to the directions provided, use the *Guidelines for Assigning SAT-8 Levels* to select the correct level of the 8th edition Stanford (or to rescreen the student).

To summarize: after the screening tests have been scored, you will have a reading and mathematics test level assignment for each student:

- the reading level assignment indicates which Complete Battery Test Booklet to administer to the student. From the Complete Battery Test Booklet, administer all subtests that you choose to administer except **for Concepts of Number and Mathematics Computation.**

- the mathematics level assignment indicates which level of Concepts of Number and Mathematics Computation subtests to administer to the student.

  For students whose mathematics and reading level assignments are the same, all subtests should be administered from the same Complete Battery Test Booklet.

  For students whose mathematics level assignment is different from their reading level assignment, the Concepts of Number and Mathematics Computation subtests should be administered from the Mathematics Separate Test Booklet.

MATHEMATICS APPLICATIONS: A SPECIAL CASE

When a student's mathematics test level assignment is different from the reading level assignment, we have said that the Mathematics Separate Test Booklets should be used for the Concepts of Number and Mathematics Computation subtests. Note that the Mathematics Separate Test Booklets contain the Mathematics Applications subtests as well. Experience with previous editions of the Stanford has shown that Mathematics Applications performance is dependent on reading/language ability as well as computational skill. (Scores of most hearing impaired students on the Mathematics Applications subtest resemble their Reading Comprehension subtest scores rather than their Mathematics Computation subtest scores.)

- When a student screens into a **lower** level in reading than in mathematics, the level of the Mathematics Applications subtest should be the same as for the other reading-related subtests. Therefore, the student should take the Mathematics Applications subtest from the Complete Battery Test Booklet.
- If a student screens into a **higher** level in reading than in mathematics, then the student should be administered the Mathematics Applications subtest at the **same** level as the other mathematics subtests.

ANSWER DOCUMENTS

The term "answer document" refers to the document on which the students mark their answers. At the Primary 1 and Primary 2 levels, the answer documents are the machine-scorable test booklets. At all other levels, they are the separate answer sheets.

Since students mark all of their answers directly in the test booklets at the Primary 1 and Primary 2 levels, those who are assigned to different reading and mathematics levels may need to use the machine-scorable booklets for some subtests and separate answer sheets for other subtests. For example, a student who was assigned to Primary 2 in reading and Primary 3 in mathematics will need to mark answers to the reading-related subtests directly in the Primary 2 Complete Battery Test Booklet. The student will then use a separate answer sheet in conjunction with the Primary 3 Mathematics Separate Test Booklet when taking the Concepts of Number and Mathematics Computation subtests.

The answer sheets that correspond to the Mathematics Separate Test Booklets at the Primary 3, Intermediate 1, 2, and 3, and Advanced 1 and 2 levels contain answer grid areas for some reading-related subtests as well. When administering these subtests to students who are using mathematics separate booklets at these levels, **make sure that students understand which sections of the answer sheet should be used.** Become familiar with the answer sheets so that you can demonstrate to the students where to mark their answers.

Student-identifying information must be correctly entered on all answer documents (machine-scorable booklets and answer sheets). **It is essential that the birthdate be entered accurately for all students.** If students have separate answer documents for reading and mathematics, **the name entry must be identical, character for character,** and **the birthdate must be entered on both documents.** For multihandicapped students or younger students not familiar with test taking, we recommend that you complete these identification grids for the students.

LOGISTICS

Because of the individualized nature of these testing procedures, arranging the testing schedule may be tricky. Within a given classroom, students may be assigned to different levels of the test. Furthermore, some of the students (who screened into different reading and mathematics levels) will need to take the Concepts of Number and Mathematics Computation subtests from the Mathematics Separate Test Booklets and all other subtests from the Complete Battery Test Booklets at a different level.

We recommend the following approach to scheduling the tests:

(1) Group the students for all reading-related subtests first. All these subtests are administered from the Complete Battery Test Booklets for all students. (If you are administering Mathematics Applications, see above for test grouping.)

(2) When all reading-related subtests have been administered, regroup the students based on their mathematics level assignments.

- Students who screened into the same level reading and mathematics will take their Mathematics Computation and Concepts of Number subtests from the same complete battery test booklets they used for their reading test.
- Students who screened into a mathematics level different from their reading level will take the Mathematics Computation and Concepts of Number subtests from the Mathematics Separate Test Booklets.

(3) It is possible for all students taking the same level of the mathematics subtests to be tested as a group, even though some will be using complete battery answer documents and some will be using mathematics separate answer documents.

The schedule and organization of the testing periods should be planned carefully before the actual testing begins.

TESTING CLIMATE

Students should be alert and relaxed when taking the test.

- Regardless of the method of communication used, it is important to guard against fatigue for hearing impaired students whose communication is visually oriented. Rest periods should be used liberally between subtests, and overloading of testing should be avoided.
- The room should be free of visual distractions.
- A student group should be small enough and well enough arranged so that all students can easily see you.
- During the test, be alert to problems that may arise: broken pencils, etc.
- Become familiar with the test materials so you can concentrate on communicating with the students rather than on trying to decipher test items and directions for the first time.

PRACTICE

Most hearing impaired students are familiar with taking standardized achievement tests. Therefore, there is usually no need to spend much time in familiarizing these students with test procedures. However, for some students -- very young or first-time test takers or multihandicapped students -- it is important to do as much as possible to familiarize these students with the testing procedures. Every effort should be made to ensure that all the students understand how to complete the test items ("filling in the bubbles") and where the test begins and ends. Here, again, reviewing the test and the administration manual ahead of time will enable you to assist students in understanding what is required of them.

The sample items given at the beginning of each subtest will help the students understand the format of the items on the test and the manner in which they are to mark their answers. Many student misunderstandings can be eliminated by carefully monitoring the student responses to the sample items. Clarifying the test directions before the testing begins is encouraged. Adding your own practice items is permissible if done fairly, but they should not give the students answers (or hints to answers) for the actual test questions.

The screening tests will also provide an opportunity to resolve many difficulties in taking the test, such as marking only one response to a question, etc.

TIME LIMITS

Time limits are described in the *Directions for Administering* booklets by subtest and test level under the heading "Proposed Schedule for Administering."

You should develop for your own situation a blueprint for the testing schedule. **FOR THE NON-DICTATED SUBTESTS**, the time limits given in the *Directions for Administering* **must be followed exactly. FOR THE TEACHER-DICTATED SUBTESTS** the time limits listed are approximate. Assume that you will need more than the amount of time listed to administer these subtests.

COMMUNICATION MODE

Many hearing impaired students do poorly on achievement tests, not because they lack the skills necessary to make correct test item responses, but because they do not understand the tasks that they are required to perform. **Communicating the intent of the tasks required for the tests is of paramount importance.**

The **method of communication** to be used in the administration of the test **is the method normally employed in the instructional context** with the students being tested (e.g., speech only, a combination of speech and signs, etc.). Throughout the *Directions for Administering* at each test level such directions as "say," "dictate," "listen carefully," "read," etc. are meant to be interpreted within the context of this "usual method" of communication employed with the students being tested.

While flexibility is allowed in communicating the test instructions to the students, do not alter the individual test items in any way. This means you should not give individual assistance to students after the testing has begun. For dictated subtests, you should try to stay as close as possible to the format of the item as it is presented in the teacher directions.

DICTATED SUBTESTS

Dictated subtests are those in which each of the item strings is dictated to the student and is not printed in the test booklet. The dictated subtests are as follows:

Primary 1

Word Study Skills
Concepts of Number
Mathematics Applications
Spelling
Language
Environment
Listening

Primary 2

Word Study Skills
Concepts of Number
Mathematics Applications
Language
Environment
Listening

Primary 3

Listening

For these subtests, it is essential that you be thoroughly knowledgeable about the format of the test and the vocabulary of the items that are to be dictated.

The following comments will alert you to some of the important issues related to administering the dictated subtests. (Some of these comments pertain only to situations in which signs are used as the mode of communication.)

- In the dictated spelling test at the Primary 1 level, do not fingerspell the target word.
- The Mathematics Applications items measure a student's ability to deduce what mathematical operation will solve a given word problem. When the items are not well communicated, students will often not be able to make a correct deduction. Make sure that students completely understand the sample items before beginning the test. It is permissible to prepare overheads with the text of the dictated portions of the item. This will help to ensure that the items are understood.
- Certain words and phrases, used mainly in the Mathematics

Applications subtests, cause special problems for many hearing impaired students. These include:

-- "left" or "left over"
(e.g., "How many are left?")
-- "many more"
(e.g., "How many more?")
-- "more than", "greater than," "fewer than," "least," "most," "greater," "greatest," etc.

When previewing the test, you should consider carefully how these concepts will be best communicated to your students. Also, in deciding whether or not to administer the Mathematics Applications subtest, you should give thought to whether a student's educational experiences have included the decoding of word problems using these expressions.

CADS recommends that for the mathematics subtests -- and for other subtests with a special vocabulary -- the teacher of that subject administer the test.

- Verb tense is a potential source of confusion in dictated items. Understanding a time sequence may be important to solving a problem. For example, in the item

  Jane's cat had 5 kittens. Jane gave 3 kittens away. How many kittens does Jane have now?

  the understanding of tense is crucial to the understanding of the problem. Here again, you should consider carefully how to communicate these test items.

- Some dictated test items contain words in the item stems which, if signed, reveal the correct answer to the student. This is especially true in the Concepts of Number subtests. Words such as "circle," "triangle," and "square" should be communicated in such a way that they do not reveal the correct answer.

- Technical terms, such as words which refer to the metric system, e.g., "millimeter," "gram," "liter," etc., should also be communicated in such a way that they do not reveal the correct answer.

- Idioms, figures of speech, and metaphorical expressions appear occasionally throughout the dictated items. These expressions are commonly understood by hearing children at very young ages, but they may not be familiar to hearing impaired students. Present these items in a way that ensures that the students understand the idiomatic content of the expressions.

- In the dictated Mathematics Applications subtests, there are long sentences with subordinate clauses and phrases. Consider carefully how these relationships might best be communicated to the students.

MACHINE-SCORING

If you plan to send your tests to San Antonio for machine-scoring you must first obtain the *Special Order for Scoring Services* packet from CADS. Before sending your tests to San Antonio to be scored, please take a few minutes to do the following:

- **check all answer documents and erase all stray marks**

- **VERY IMPORTANT: make sure that the student identification grids are filled out correctly, especially the BIRTHDATE** (the hearing impaired norms are based on age).

Send answer documents to:

The Psychological Corporation
Scoring Service Center
555 Academic Court
San Antonio, Texas 78204-2498

Questions? Call CADS at:
202/651-5575 or 800/451-8834 ext 5575

APPENDIX D

SCORE INTERPRETATION MATERIALS

ACHIEVEMENT TESTING OF DEAF STUDENTS:

THE 8TH EDITION STANFORD ACHIEVEMENT TEST

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February, 1990

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ACHIEVEMENT TESTING OF DEAF STUDENTS: THE 8TH EDITION STANFORD ACHIEVEMENT TEST

1. *What is the 8th Edition Stanford Achievement Test (1989)?*

The 8th Edition Stanford (SAT-8) is an achievement test which measures the abilities and skills of students in a number of different subtest or subject areas: e.g., reading, language, spelling, mathematics, science, and social science. (The Stanford Achievement Test, referred to as the SAT-8 in this booklet, should not be confused with the Scholastic Aptitude Test, the more widely known SAT.) Unlike the 7th Edition Stanford with its six difficulty levels, the SAT-8 is available at eight difficulty levels which measure content that is considered appropriate for HEARING students in specific grades in school. The eight difficulty levels and their corresponding grade levels for use with HEARING students are:

Primary 1	1.5	to	2.9
Primary 2	2.5	to	3.9
Primary 3	3.5	to	4.9
Intermediate 1	4.5	to	5.9
Intermediate 2	5.5	to	6.9
Intermediate 3	6.5	to	7.9
Advanced 1	7.5	to	8.9
Advanced 2	8.5	to	9.9

Assignment of **DEAF** students to one of these eight levels is discussed in Questions 4 and 5 of this booklet. Due to the more gradual English language development of many deaf students, schools enrolling these students often use the test through high school and, in some cases, even into the postsecondary years. (Schools also use the Stanford with some of their hard of hearing students.) The SAT-8 is usually not administered to deaf children under age 7.

2. *How is the SAT-8 used with deaf students different from the Stanford used with hearing students?*

The SAT-8 used with deaf students is NOT different from the Stanford used with hearing students. The test items and questions are exactly the same for both deaf and hearing students.

Although the test itself is identical for both groups, a major difference does exist between how the Stanford is administered to deaf students and how it is administered to hearing students. With deaf students the assignment of the test level is made on the basis of brief "screening tests," one in reading and one in mathematics. (These screening tests are described in Questions 4 and 5.) Also, because the SAT-8, Form J, has been normed on a sample group of deaf students, special norm tables are available from the Center for Assessment and Demographic Studies (CADS) at Gallaudet University enabling schools to compare their deaf students to deaf students of the same age in the norm group. (Comparison to hearing students who took the same level of the test, regardless of age, is also possible because none of the test items has been changed.)

3. ***Why can't a school assign a level of the SAT-8 to its deaf students the same way it is done with hearing students, i.e., on the basis of the grade in which a student is enrolled?***

Hearing students are generally assigned a test level based on their grade in school, and everyone in that grade is approximately the same age. For example, hearing students at the end of 3rd grade are usually in the 8- to 9-year-old age range. If a school is using the Stanford Achievement Test, then these hearing students in the 3rd grade would probably be given the Primary 3 level of the test, as the answer to Question 1 indicates.

When CADS first began work in the testing area in the late 1960s and early 1970s, its staff collected achievement test scores of many deaf students across the U.S. An analysis of these scores revealed that a very large number of them appeared to be the result of guessing, indicating that numerous deaf students were being assigned an inappropriate level of the Stanford (usually a level too difficult for them). Many of these scores were, therefore, useless for determining the academic performance of the students.

Deaf students often develop their English language and reading skills more slowly than hearing children. Since it would be unfair for a 3rd grade deaf student to be given a Primary 3 test level when that student is actually reading at the 2nd grade level, CADS has designed brief "screening tests" which make it possible for a school to assign more quickly and accurately the proper test level of the SAT-8 to its deaf students.

4. *How is the correct assignment of test level made for deaf students?*

CADS has developed very brief screening tests which cover the full difficulty range of the eight Stanford test levels and thus enable a school to determine the correct test level assignment. For the SAT-8, these screening tests resulted from a pilot project conducted by CADS in the spring of 1989 in which a large number of test items with various difficulty levels were administered to a sample of deaf students across the U.S. After analysis of the results of this pilot project, CADS selected the final items to be included in the screening tests.

In testing its deaf students, a school usually orders its screening tests from CADS first. It then administers and scores the screening tests, and on the basis of these screening test scores -- one in reading and one in mathematics -- assigns the appropriate SAT-8 level to each of its students. The school then orders the SAT-8 materials from CADS.

5. *Please describe the screening test procedure more fully.*

There are 16 short screening tests, eight in reading and eight in mathematics: i.e., one screening test in reading and one screening test in mathematics for each of the eight difficulty levels of the SAT-8. (No screening test has more than 12 items.) The screening tests are accompanied by a list of subtest instructional objectives for each level of the test. Based on previous test scores, knowledge of a student, and a consideration of the objectives covered at each level of the test, the teacher or test administrator selects one screening test in reading and one in mathematics for each student. (This presupposes, of course, that the teacher or test administrator has an accurate knowledge of the contents of the SAT-8 and its progression through the eight difficulty levels.) For many deaf students, these two screening tests will be at different levels; for example, a student may receive a Primary 2 reading screening test and a Primary 3 mathematics screening test.

School staff then administer and score the screening tests and use the scores in conjunction with a table accompanying the screening tests to assign a SAT-8 level for each student. (Unlike the 7th Edition Stanford, there is NO machine-scoring service available for these SAT-8 screening tests.) Many deaf students, on the basis of their screening test scores, will be assigned two different SAT-8 test levels: one for reading and reading-related subtests (including the Mathematics Applications subtest, which is dependent on reading) and one for the Mathematics Computation and Concepts of Number subtests. In some cases, the screening test results simply confirm the teacher's decision regarding the test level at which a student is performing. In other cases, these results may alert the teacher to a possible discrepancy between that decision and the student's actual performance level.

> THE SCREENING TEST PROCEDURE IS A CRITICAL STEP FOR OBTAINING VALID TEST RESULTS WITH DEAF STUDENTS. TEST LEVEL ASSIGNMENT FOR THE SAT-8 SHOULD NOT BE MADE SIMPLY ON THE BASIS OF A STUDENT'S AGE OR GRADE IN SCHOOL.

6. ***What should a school do if it is unable to use the screening test procedure with its deaf students?***

If, for some reason, a school is unable to use the screening test procedure with its deaf students, it should review the test level and raw scores from the previous test administration for each student. (Note that the eight levels of the SAT-8 do not correspond directly to the six levels of the 7th Edition Stanford.) Using this information along with staff knowledge of the student's progress since that last testing and of the content of the SAT-8, the school then determines as accurately as possible the correct SAT-8 level assignment.

In this case, AFTER administering the SAT-8, the school should investigate whether its assignment of test level was accurate. This is done by examining the test results for each student to see if they are in the "guessing range," which might indicate the test level assigned was too difficult, or in the "topping out range," which usually indicates too easy a test level for the student. (Question 7 discusses the "guessing range"; Question 8 explains "topping out.")

7. ***What do you mean by test results being in the "guessing range"?***

The "guessing range" refers to the number of correct answers a student could obtain on a particular subtest by guessing. (This is sometimes referred to as scoring "at chance level.") A score within this guessing range usually indicates that the test level assignment was too difficult for the student.

If school staff handscore the tests, how do they determine whether a score is in the guessing range? To arrive at this range, you divide the total number of items in a subtest by the number of response options for each item. An example will illustrate this. If a subtest has 60 items and each item has 4 response options, then the cutoff score for determining the guessing range would be: 60/4 = 15. Answering 15 or fewer items on this subtest correctly would be scoring in the guessing range. Put another way, for an item with four possible correct responses, a student has a 1 in 4 chance, or 25%, of guessing the right answer. For a 60 item test, the cutoff score for the guessing range would be one fourth or 25% of 60 = 15. If another subtest had only 3 possible response options for each question, the cutoff score for determining the guessing range would be: 60/3 = 20. Here, a raw score of 20 or less correct would be in the guessing range.

8. *What is meant by a student "topping out"?*

A topic related to guessing, but at the upper end of the score scale, is that of "topping out." If, for example, a student answered correctly ALL of the items on a particular subtest, school staff might wonder if that student could not have demonstrated a higher level of achievement by taking a higher level of the test. In answering all the items correctly, the student has "topped out."

In contrast to the student scoring in the guessing range, the SAT-8 level assignment for this student appears to have been too low, i.e., the test level is too easy. Although it is difficult to say exactly at what raw score total a student has "topped out," it seems reasonable to say that if a student answers 90% or more of the total items in a subtest correctly, that student is in the "topping out range." For example, if a subtest has 60 total items and a student answers 54 items correctly (90% of 60), that student can be considered to be in the "topping out range" and may well be able to take a higher level of the SAT-8. A score of 54 or higher on this particular subtest would put a student in this range.

Please remember that in discussing "guessing" and "topping out," we are talking about RANGES and APPROXIMATIONS, rather than exact points: i.e., within this range Student A appears to be guessing on a particular subtest; at approximately this raw score level Student B has topped out. Also, the fewer items on a test, the more difficult it is to determine the guessing range or the topping out level precisely.

9. *Should a school retest a student whose scores are within the "guessing range" or the "topping out range"?*

Many educators feel that deaf students are overtested and that excessive testing consumes valuable time that could otherwise be used for teaching. The final decision on retesting should be made by each school and perhaps will depend on what use the school makes of the scores. In any case, school staff should be aware of the pitfalls associated with scores at both the upper and the lower ends of the raw score scale.

10. *What should a school do if it is believed that a student has been assigned an inappropriate SAT-8 level on the basis of the screening test procedure?*

In this case, reevaluation is in order, either by administering another screening test or by consulting with staff familiar with the student and familiar with the Stanford test contents in an attempt to determine the appropriate SAT-8 level.

11. ***How can test administrators prepare for giving the SAT-8 to their deaf students?***

In most schools, the classroom teacher administers the SAT-8 to students. It is important that in subjects having a special vocabulary or technical terms (e.g., mathematics) the person administering that particular subtest be familiar with the technical vocabulary -- especially if sign communication is used for these terms. This may mean that the teacher of a particular subject is the ideal person to administer its corresponding subtest to the students.

Deaf students need to know exactly what is expected of them in the testing situation. Practice and sample items -- to which test administrators may add sample items of their own -- are important for communicating to students the format of the test and the type of items appearing on the test. These practice items may be especially helpful to younger students, to first-time test takers (including children from another language or culture background), and to multihandicapped students. (Clearly, test administrators should avoid suggesting or hinting at the correct answers to actual test items of the SAT-8, since this invalidates any test results.)

Perhaps the most important preparation a test administrator can make is to become familiar with the test and the test directions BEFORE testing begins. The administrator should be aware of the time limits for each subtest, must decide how to communicate the test directions (and the test items, if they are dictated) to the students, and should clearly indicate where the test begins and ends. It is especially important, if a student is taking two different levels of the test and therefore using two different answer documents, to make the student aware of where to begin and end the particular subtest being administered.

12. ***What communication method should be used in administering the SAT-8 to deaf students?***

The variety of communication methods used with deaf students forces flexibility in test administration directions. The important thing is that students know what is expected of them. Therefore, the method of communication used in the administration of the SAT-8 should be the same method normally used in the classroom with the deaf students being tested.

13. ***Should a school administer ALL the SAT-8 subtests to its deaf students?***

Each school must decide which subtests to administer to its deaf students. (For recommendations by CADS of which subtests to administer, consult the booklet *Administering the 8th Edition Stanford Achievement Test to Hearing Impaired Students,* revised in 1990 for the SAT-8 norming project and available from CADS upon request.) However, in light of a widespread feeling that many deaf students are overtested, schools should examine carefully the SAT-8 subtests to determine which are appropriate for their deaf students: e.g., whether their curriculum covers the content of a particular SAT-8 subtest and whether the SAT-8 adequately measures the content of that curriculum. Some educators believe that certain subtests (e.g., Social Science) become reading tests for deaf students rather than tests of particular subject matter skills, and that the DICTATED subtests are tests of memory for these students rather than tests of a particular subject matter. All of these concerns should be involved in the decision concerning which subtests to administer to deaf students.

14. ***Must a school follow the time limits prescribed in each level's administration manual for the SAT-8?***

The time limits for the NON-DICTATED subtests are given in the *Directions for Administering* booklets for each level of the SAT-8. (Time limits for the DICTATED subtests are approximate.) Schools participating in the 1990 norming of the SAT-8 with deaf students were requested to follow the time limits for the NON-DICTATED SUBTESTS exactly. Accordingly, if a school does not adhere to these time limits, it is difficult to interpret the norms which reflect the use of these limits.

15. ***What scores are available on the SAT-8 for use with deaf students?***

The SAT-8 provides various kinds of scores: raw scores, grade equivalent scores, scaled scores, and age based percentile rankings. (Please refer to the sample "Individual Score Report" at the back of this booklet which has the types of scores lettered according to the following outline.)

A. **RAW SCORES** give the number of correct and incorrect answers and the number of items left blank on a particular subtest. Examining the number of correct and incorrect answers in particular item clusters or subgroups within a subtest can indicate strengths or weaknesses of a student. (See Question 17 for a fuller discussion of item clusters.) Sometimes there are patterns in the mistakes a student makes, and discovering these patterns can lead to remedial help. Sometimes incorrect responses by a student or questions left blank may indicate the school's curriculum did not cover that particular material (e.g., fractions may not have been taught in a particular year, yet the test level has several items on fractions). Leaving a large number of items blank at the END of a subtest may indicate problems with time limits rather than problems with the content matter of the subtest.

B. **SCALED SCORES** (S.S.) represent approximately equal units on a continuous scale. One advantage of scaled scores is that they are comparable across different levels of the same subtest area (e.g., scaled scores can be compared on the Mathematics Computation subtest from year to year, even if the student took a different level of the test each year.) They are valuable for measuring a student's growth in a particular subject area from year to year. Scaled scores can also be averaged to summarize the performance of a class in a particular subtest area (e.g., Reading Comprehension).

Scaled scores are NOT equivalent across content areas. For example, a 610 scaled score in Mathematics Computation is NOT equivalent to a 610 scaled score in Reading Comprehension. Each subtest area has its own system of scaled scores. Also, they CANNOT BE USED to create an average scaled score across subtests for an individual student (e.g., by averaging out a 600 in Reading Comprehension, a 700 in Mathematics Computation, and a 720 in Concepts of Number to arrive at an average scaled score of 673).

C. **GRADE EQUIVALENT SCORES** (G.E.) are indicated by the grade plus the month of the school year. A 6.2, for example, indicates the 3rd month of the 6th grade (6.0 is the 1st month of Grade 6). To give an example of a G.E. score: if a 14-year-old deaf student achieves a 6.2 G.E. score on the Primary 3 Reading Comprehension subtest, this means that the student is performing as an average

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hearing student in the 3rd month of the 6th grade would perform on the Primary 3 subtest, which is designed for hearing students in the 3rd to 4th grade. By using the G.E., the school is comparing this 14-year-old deaf student to hearing students in approximately the 3rd to 4th grade range, i.e., hearing students who are about 8 or 9 years old.

> Note: A GRADE EQUIVALENT SCORE OF 6.2 DOES NOT NECESSARILY MEAN THAT A STUDENT IS DOING 6TH GRADE WORK OR THAT THE STUDENT SHOULD BE IN THE 6TH GRADE. In looking at grade equivalents, especially with deaf students, one should always connect the G.E. with the LEVEL OF THE SUBTEST taken and interpret the G.E. with caution, especially for parents who may be unfamiliar with its exact meaning.

PERCENTILE RANKINGS (H.I. %-ile) **Although not shown on the sample score report,** the percentile rankings compare a deaf student to other deaf students of the SAME AGE who took that particular subtest area in our 1990 norming project, regardless of LEVEL of the subtest. (CADS is also attempting to produce "H.I. %-ile" norms by age + level of the test.) For example, a 17-year-old deaf student who obtained a percentile ranking of 94 in Reading Comprehension did the same or better than 94% of all 17-year-old deaf students in the 1990 norm group; 6% of the 17-year-old students in the 1990 norm group did better than this student. Remember that a student scoring at the 50th percentile is scoring at the group "average": i.e., 50% of the students in the norm group received a higher score on that particular subtest, and 50% received a lower score.

****

N.B.: A sample SAT-8 Summary Form to record these various types of scores is included on the last page of this booklet for possible use in IEP preparation, parent conferences, student files, etc. A school may want to modify this form for its own purposes.

****

16. ***Is it possible to obtain an "overall" achievement score by averaging a student's grade equivalent scores in the various subtest areas?***

No, grade equivalent scores cannot be averaged in order to obtain a single, overall score. As indicated above, grade equivalent scores should be used very cautiously. If a G.E. score is used, each subtest score -- e.g., in reading or mathematics or science -- should be considered individually and NOT averaged out into a single score.

17. ***Besides the score comparisons to deaf students and to hearing students in the norm groups, what other uses can schools make of the score results from the SAT-8?***

The items within each SAT-8 subtest have been grouped by the test publisher into various clusters or subgroups. For example, the Primary 3 Mathematics Computation subtest has 12 items dealing with "Subtraction of Whole Numbers." By observing student response patterns in this subtraction cluster area -- e.g., incorrect responses or items left blank -- a teacher may be able to address specific weaknesses (or strengths) of an individual student or of a class.

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The sample "Individual Score Report" which appears toward the back of this booklet shows the type of cluster scores which can be obtained from the various subtests of the SAT-8. These score reports are available from CADS provided a school has obtained a magnetic tape of its score results on the SAT-8 from the scoring center in San Antonio.

The individual student score reports from CADS will indicate whether a particular subtest raw score is within the guessing range or the topping out range. (See Questions 7 and 8.) If a student's score is within the guessing or topping out range on any subtests, no grade equivalent, scaled score, or percentile ranking will be printed on the CADS individual student score reports. To report such a score could lead to an invalid interpretation of the student's achievement in a subject area. By noting the guessing or chance level scores, a school may be able to assist students in improving their skills in specific areas.

18. *What is the "Student-Problem Analysis"?*

In addition to the individual score reports, if a school obtains a magnetic tape of its score results, CADS can produce a "Student-Problem Analysis" ("S-P Analysis"). This analysis of the SAT-8 Reading Comprehension and Mathematics Computation scores goes beyond the standardized score results and examines the PATTERN of correct and incorrect responses which a class or other group of deaf students makes on these two subtests. The S-P Analysis focuses on particular test items or content areas within a subtest which are causing difficulty for students. The analysis is an attempt to pinpoint weaknesses and strengths of students and thus enables a teacher to individualize instruction. Using this analysis, a teacher may avoid repetition of material already known to the class and concentrate on material less known or not adequately absorbed. The S-P Analysis may also be used in preparing a student's IEP or in parent-teacher conferences.

If you wish to learn more about this analysis, please contact CADS and ask for the booklet, *The Student-Problem Analysis*. PLEASE REMEMBER: in order to obtain this analysis from CADS, you must first send your SAT-8 answer documents to the scoring center in San Antonio and obtain a magnetic tape of your score results. (See Question 21 about machine-scoring of the SAT-8.)

19. *What does it mean if a deaf student took the Stanford in two consecutive years and the results show a decline in several subtest areas and no improvement in others?*

Variation in student scores from one test administration to the next can be due to a number of reasons: having a "bad" day, illness, etc. It may mean that there has been no growth in a particular subject area or that the test was not sensitive enough to detect the growth. It may also mean that the type of items in a particular subtest was not covered in the school's curriculum or in the student's class.

It should also be remembered that the scores a student receives on the SAT-8 are only one indication of that student's academic achievement level. When test scores are combined with classroom performance, homework, etc., a clearer picture emerges of strengths and weaknesses that will clarify objectives in educational planning. It is essential that test interpretation focus on the individual's performance and on growth in the subject areas. A comparison of a student's scores to those of other students, either

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hearing or deaf, is of limited value unless it is used to pinpoint these individual strengths and weaknesses, especially in reading and mathematics. Furthermore, teachers are aware that achievement test scores are only one indication of students' development within the school environment and that their social and emotional development is also extremely important.

20. ***How can school staff decide whether to administer the SAT-8 to their deaf students?***

The school may order a sample set of the SAT-8 materials from CADS and, on the basis of staff inspection and evaluation of these materials, decide whether the test meets its curriculum objectives and is therefore appropriate for its deaf students.

Although technical analysis of the SAT-8 -- regarding reliability and validity, for example -- is not completed, a discussion of these issues by CADS of the previous edition of the Stanford, the 7th Edition, may be reviewed in *Understanding the scores: Hearing impaired students and the Stanford Achievement Test (7th Edition)*. (It is believed similar results can be anticipated for the SAT-8.) This technical manual is available from CADS upon request.

21. ***Are machine-scoring services available for the SAT-8?***

Yes, machine-scoring services are available for the SAT-8 from the Psychological Corporation's scoring center in San Antonio, Texas. (Machine-scoring of the 7th Edition Stanford is still done at the Iowa City scoring center.) If you plan to have your tests machine-scored, please contact CADS for the necessary order form and for questions. The special norms for deaf students on the SAT-8 -- the percentile rankings by age discussed above -- are NOT available from this scoring center in San Antonio.

If a school obtains a magnetic tape of its SAT-8 scoring results from San Antonio, it may send this tape to CADS and obtain individual student score reports which include not only the raw scores, the grade equivalent, and scaled scores but also the percentile rankings by age which compare the school's students to deaf students in the 1990 norm group. Contact CADS if you have questions regarding these reports and their costs. (Schools, of course, always have the option of HANDSCORING their tests.)

22. ***Is a large-print or braille edition of the SAT-8 available for blind students?***

Large-print and braille editions of the SAT-8, Form J, are available from the American Printing House for the Blind, P.O. Box 6085, Louisville, KY 40206-0085; phone: 502-895-2405.

****

For further information on the SAT-8, contact:

Testing Department
Center for Assessment & Demographic Studies
Gallaudet University
800 Florida Avenue, N.E.
Washington, DC 20002-3625
Phone: 202-651-5575 (V or TDD) or 800-451-8834 Ext. 5575 (V or TDD)

NEWTOWN ELEM (00-000) LUNA (00)

Individual Score Report
Stanford Achievement Test, 8th Edition

Student: Anon. Student 119
Test Level: P1 Reading & Math
Form: J

Test Date: 05-05-89
Birth Date: 07-07-82
Age at Testing: 6

The Primary 1 level of the SAT-8 measures content commonly taught hearing students in grades 1.5 - 2.9.

			A			B	C
SUBTEST Item Cluster	No. of Items	Right	Wrong	Blank	Percent Right	Scale Score	Grade Equiv
WORD READING/VOCABULARY	30	11	19	0	37	452	1.3
Match 3 Printed Wds W/Pic	30	11	19	0	37		
READING COMPREHENSION	40	8	32	0	20		???
Two-Sentence Stories	4	2	2	0	50		
Short Reading Passages	16	4	12	0	25		
Short Reading W/Questions	20	2	18	0	10		
MATH COMPUTATION	26	23	3	0	88	564	3.2
Addition/Whole Nos	14	13	1	0	93		
Subtraction/Whole Nos	12	10	2	0	83		
MATH APPLICATIONS	30	19	8	3	63	507	1.9
Problem Solving	12	7	2	3	58		
Graphs	3	2	1	0	67		
Geometry/Measurement	15	10	5	0	67		
SPELLING	30	17	13	0	57	500	1.7
Sight Words	5	4	1	0	80		
Phonetic Principles	18	10	8	0	56		
Structural Principles	7	3	4	0	43		

??? - This score is at or below chance level.

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SUMMARY OF RESULTS:
Stanford Achievement Test

Student's Name: ______________________ School: ______________________

Date of Birth: ______________________ City, State: ______________________

Home Contact: ______________________ Person Preparing this Report: ______________________

Test Date: ______________________ Test Date: ______________________

Edition of Test: ______________________ Edition of Test: ______________________

Age at Testing: ______________________ Age at Testing: ______________________

SUBTESTS	Test Level*	S.S.	%ile	G.E.	Test Level*	S.S.	%ile	G.E.
Reading Comprehension								
Spelling								
Language								
Math Computation								
Concepts of Number								
Math Applications								
Social Science								
Science								

*TEST LEVELS & CORRESPONDING GRADE LEVELS (as designed for **hearing** students):

P 1	Primary 1	(Grade 1.5 to 2.9)
P 2	Primary 2	(Grade 2.5 to 3.9)
P 3	Primary 3	(Grade 3.5 to 4.9)
I 1	Intermediate 1	(Grade 4.5 to 5.9)
I 2	Intermediate 2	(Grade 5.5 to 6.9)
I 3	Intermediate 3	(Grade 6.5 to 7.9)
A 1	Advanced 1	(Grade 7.5 to 8.9)
A 2	Advanced 2	(Grade 8.5 to 9.9)

Remarks: ____

Revised: 2/90

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February, 1991

ADDENDA to:

Achievement Testing of Deaf Students:
The 8th Edition Stanford Achievement Test
(February, 1990)

Question 1, Page 1: The grade levels for the eight Stanford test levels have been clarified by the publisher:

Primary 1	1.5 to 2.5
Primary 2	2.5 to 3.5
Primary 3	3.5 to 4.5
Intermediate 1	4.5 to 5.5
Intermediate 2	5.5 to 6.5
Intermediate 3	6.5 to 7.5
Advanced 1	7.5 to 8.5
Advanced 2	8.5 to 9.9

Page 10: With the completion of the CADS norming project, the percentile rankings have been added to the sample "Individual Score Report" on page 10. The sample score report on page 10 can now be replaced by the attached sample report.

There are two comparisons under the hearing impaired percentile rank column label ("HI-%ile") on the new report. The first -- labeled "All" -- is a comparison to ALL hearing impaired students in a particular age category in the 1990 norming sample; the second -- labeled "S/P" on the report -- is a comparison ONLY to the severe and profound hearing impaired students in a particular age category in the 1990 norming sample.

SAMPLE SCHOOL

Individual Score Report
Stanford Achievement Test, 8th Edition

Student: FORD, STAN
Test Level: P1 Reading & Math
Form: J

Test Date: 11-06-90
Birth Date: 07-25-75
Age at Testing: 15

The Primary 1 level of the SAT-8 measures content commonly taught hearing students in grades 1.5 - 2.5

SUBTEST Item Cluster	No.of Items	Right	Wrong	Blank	% Right	Scale Score	Grade Equiv	HI-%ile All	HI-%ile S/P
WORD READING/VOCABULARY	30	14	16	0	47	468	1.3	--	--
Match 3 Printed Wds W/Pic	30	14	16	0	47				
READING COMPREHENSION	40	18	22	0	45	481	1.5	4	7
Two-Sentence Stories	4	1	3	0	25				
Short Reading Passages	16	12	4	0	75				
Short Reading W/Questions	20	5	15	0	25				
CONCEPTS OF NUMBER	34	17	17	0	50	490	1.4	1	3
Whole Nos	24	11	13	0	46				
Fractions	3	2	1	0	67				
Operations & Properties	7	4	3	0	57				
MATH COMPUTATION	26	26	0	0	100	***		**	**
Addition/Whole Nos	14	14	0	0	100				
Subtraction/Whole Nos	12	12	0	0	100				
MATH APPLICATIONS	30	13	17	0	43	472	1.2	1	3
Problem Solving	12	2	10	0	17				
Graphs	3	0	3	0	0				
Geometry/Measurement	15	11	4	0	73				
LANGUAGE	44	16	28	0	36	486	1.4	2	3
Language Mechanics	24	6	18	0	25				
Language Expression	16	9	7	0	56				
Study Skills/ABC Order	4	1	3	0	25				
SPELLING	30	24	6	0	80	543	2.0	6	9
Sight Words	5	4	1	0	80				
Phonetic Principles	18	14	4	0	78				
Structural Principles	7	6	1	0	86				
ENVIRONMENT	40	12	28	0	30	???		--	--
Social Environment	20	6	14	0	30				
Natural Environment	20	6	14	0	30				

??? - This score is at or below chance level.
*** - This score is above measurable range.
-- - This subtest not normed for this age group. Percentiles unavailable.

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Determining Significant Gain in Student Achievement

This booklet may be used to determine whether individual students or classes of students have improved in achievement from one testing occasion to another. Specifically, it is intended to help test users make test score comparisons when one score is from the SAT-7 and the other from the SAT-8.

Below are step-by-step directions to assist test users in making these score comparisons. Also included are two sample rosters for recording the test scores. The Class Progress Summary can be used to record the test scores for a class on a single subtest; such information may be useful to a classroom teacher in instructional planning. The Student Progress Summary can be used to record the test scores on several subtests for a single student; such information may be useful to teachers and IEP committees who are focusing on an individual student.

Research has shown that for both hearing and hearing impaired students, it is very difficult to detect growth over one year's time. Tests simply do not measure accurately enough to do that. When you take into consideration the inaccuracy inherent in any test score, you must be able to demonstrate a considerable amount of growth for it to be statistically significant (not attributable to chance). **To detect growth in achievement, it is advisable to use scores from tests that were given more than one year apart.**

No test is perfectly reliable. The amount of imprecision, or unreliability, associated with a test score is related to the "error of measurement" of the score. Measurement error is smallest in the middle of the range of test scores and is greatest for very high scores (nearing 100% correct) and very low scores (in the guessing range). The error of measurement for scores on the Stanford Achievement Test is about 2 to 3 raw score points in the mid-range of the scale on most subtests. This interval corresponds to about 15 scaled score points. **Therefore, to show that a student has made a significant gain in achievement, the student's new score must exceed the old score by approximately 30 scaled score points or more.**

1. **Select subtests of interest and enter the SAT-7 scaled scores from the score report.** Do not use scores that were flagged because they were at guessing level. Similarly, do not use scores of 90% correct or higher.

2. **Use the conversion tables to find the converted SAT-8 scaled scores for the SAT-7 scaled scores.**

3. **Enter the SAT-8 scaled scores from the score report in the appropriate columns.**

4. **Compare the two scores (the converted scaled score and the SAT-8 scaled score). A student shows a significant gain in achievement if the second score exceeds the first by approximately 30 scaled score points or more.** If the scores are closer together, we cannot say for sure whether the student has made progress based on these scores. The test simply does not measure precisely enough to do that.

Stanford Achievement Test
Eighth Edition

Score Summary for

____

This student score summary folder provides space to record scores on the Stanford Achievement Test, Eighth Edition, for the Reading Comprehension, Mathematics Computation, Concepts of Number, Mathematics Applications, Spelling, and Language subtests.

Directions: For each subtest, please record the following information:

- date of testing
- test level (P1, P2, P3, I1, I2, I3, A1, A2)
- test content level (e.g., 3.5-4.5 for P3)
  Grade levels for the eight Stanford test levels (curriculum content taught hearing students nationally):

P1	1.5 - 2.5
P2	2.5 - 3.5
P3	3.5 - 4.5
I1	4.5 - 5.5
I2	5.5 - 6.5
I3	6.5 - 7.5
A1	7.5 - 8.5
A2	8.5 - 9.9

- match to student's curriculum (indicate with ✓ if the subtest measures what the student is learning in school)

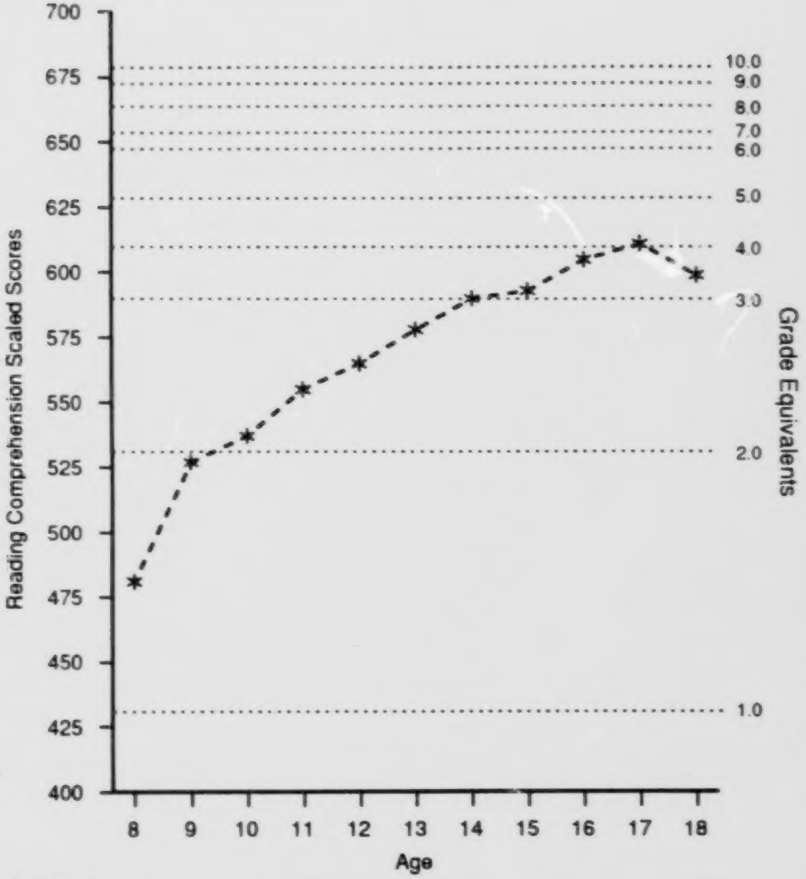
Each of the six charts shows student age on the horizontal axis. On the left are shown the scaled scores for the subtest; on the right the corresponding grade equivalents for hearing students. The dotted line shows the median score (50th %-ile) for hearing impaired students in the 1990 norming sample for each age, 8 through 18. The 1990 norming sample represented the hearing impaired special education population in 1990 for each age. As such, the dotted lines do not indicate the expected longitudinal gains for hearing impaired students because the sample does not reflect the scores of those hearing impaired students who transfer into or out of special education.

Funding for the preparation of this summary was provided, in part, by the U.S. Office of Education, Office of Special Education and Rehabilitative Services, Grant #H023C90149-90.

Center for Assessment and Demographic Studies
Gallaudet Research Institute

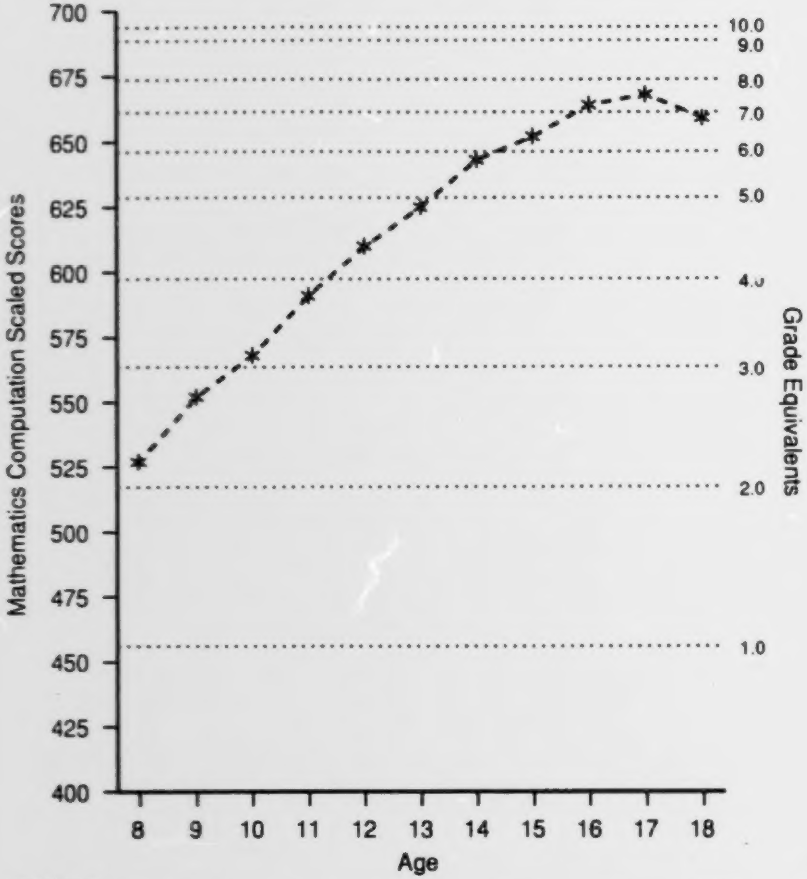
1991

Subtest: *Reading Comprehension*



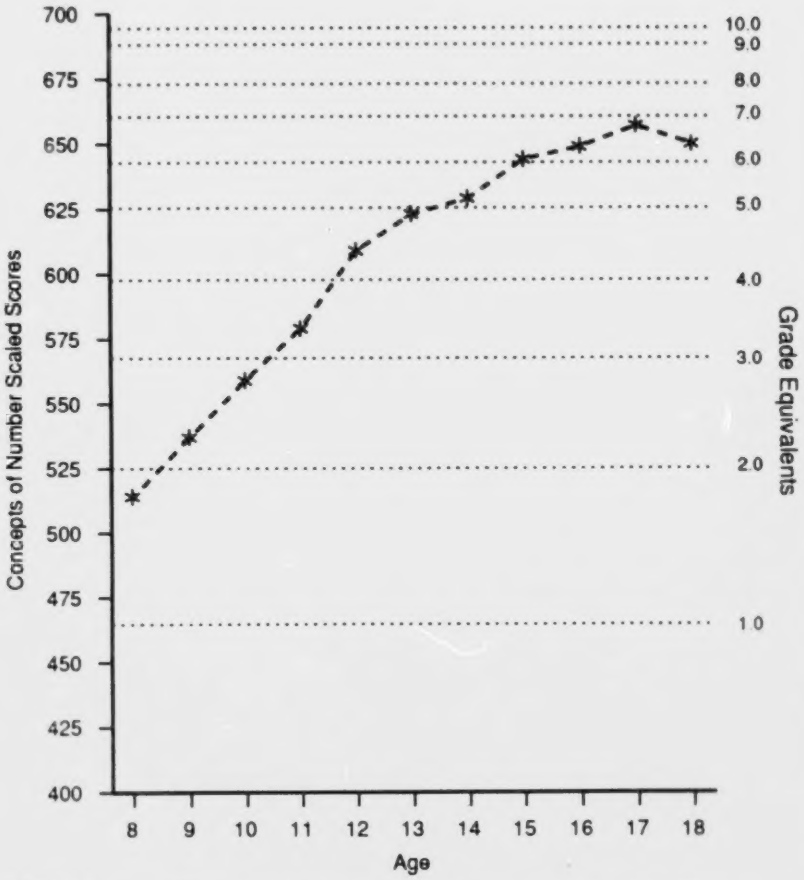
Date of Testing: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Test Level: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Test Content Level: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Matches Student's Curriculum(✓): ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Subtest: *Mathematics Computation*



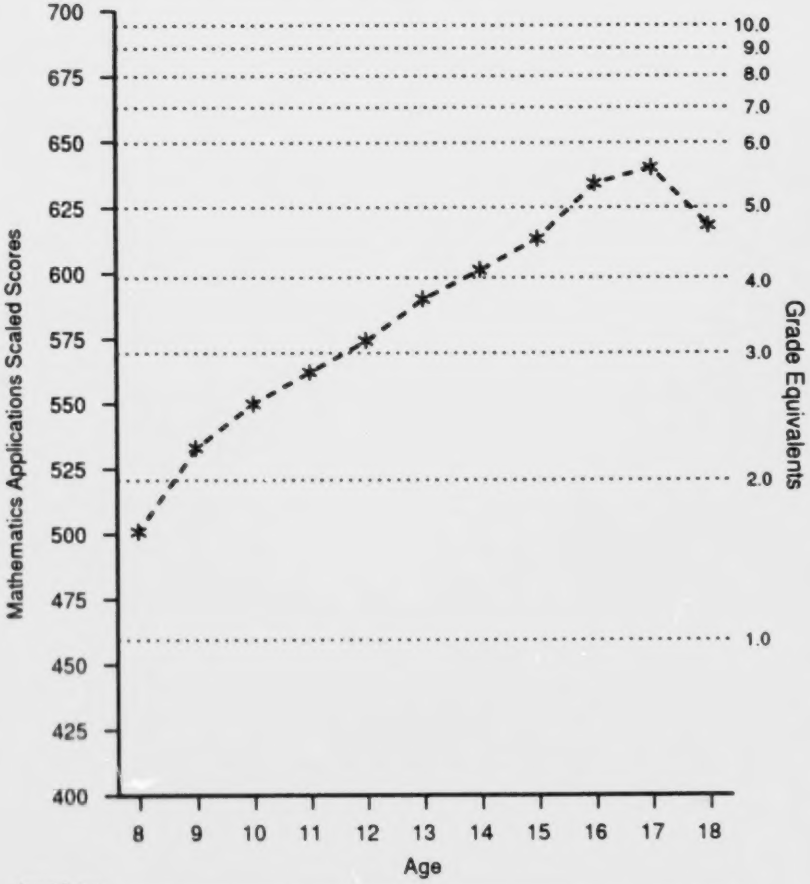
Date of Testing: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Test Level: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Test Content Level: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Matches Student's Curriculum(✓): ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Subtest: *Concepts of Number*



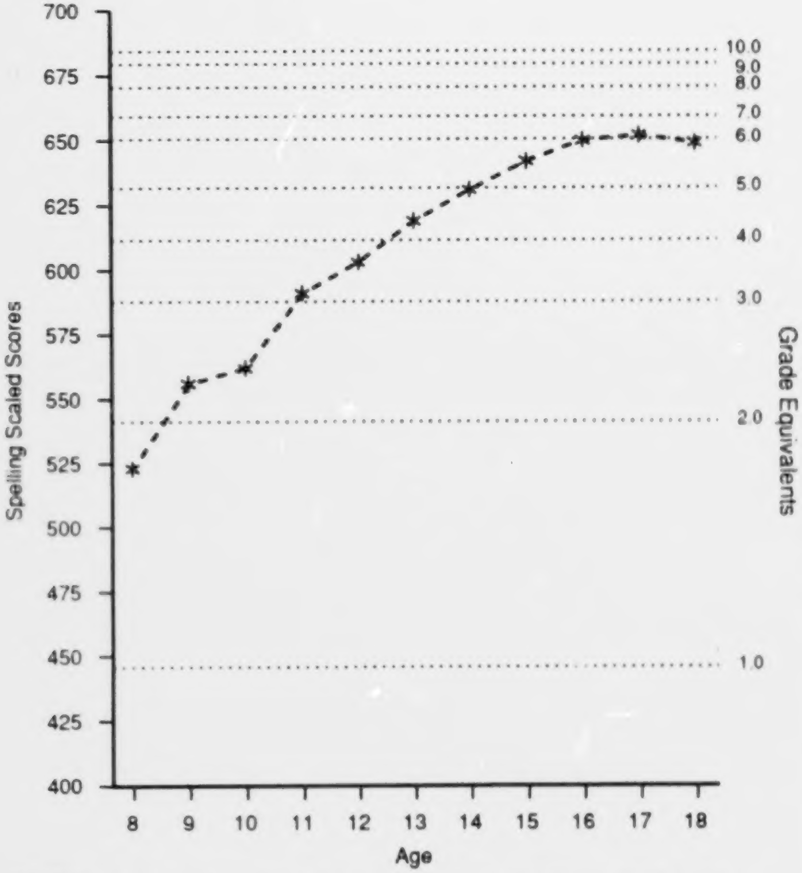
Date of Testing ___
Test Level ___
Test Content Level Matches Student's Curriculum(✓): ___

Subtest: *Mathematics Applications*



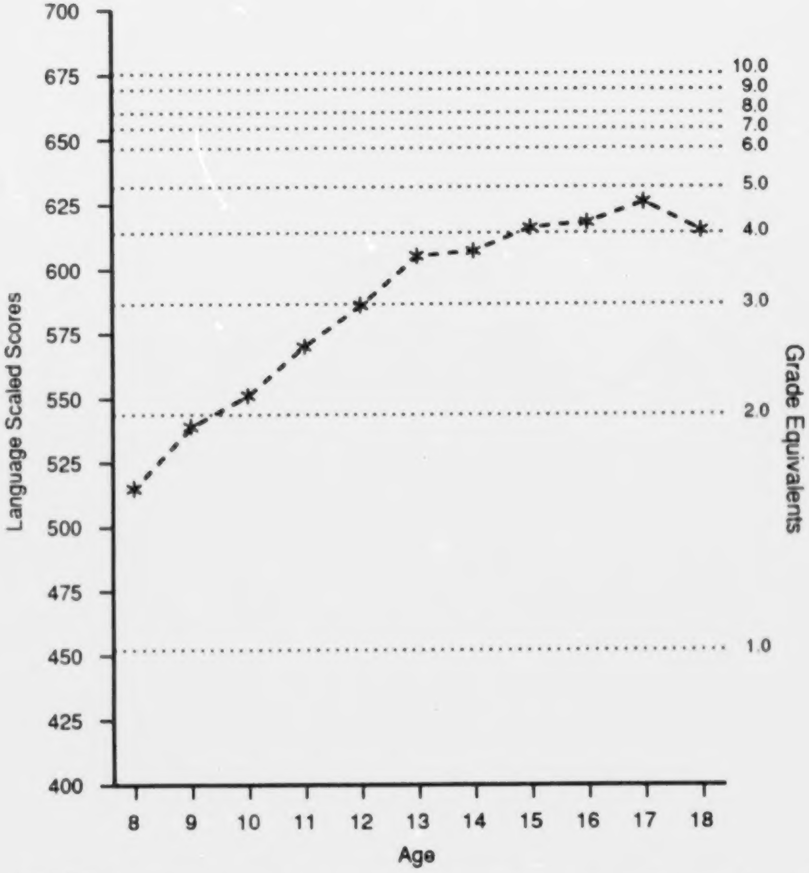
Date of Testing ___
Test Level ___
Test Content Level Matches Student's Curriculum(✓): ___

Subtest: *Spelling*



Date of Testing:
Test Level:
Test Content Level:
Matches Student's Curriculum (✓):

Subtest: *Language*



Date of Testing:
Test Level:
Test Content Level:
Matches Student's Curriculum (✓):

Student-Problem Analysis:
A Means for Studying Student Responses to Test Items

Center for Assessment and Demographic Studies
Gallaudet Research Institute

1991

This paper is based on one by Brenda W. Rawlings and Thomas E. Allen called, *Response Patterns on the Stanford: A New Means of Assessing Student Performance*. Presented at the biennial meeting of the Conference of American Instructors of the Deaf, Santa Fe, June, 1987.

Funding for the preparation of this paper was provided, in part, by the U.S. Office of Education, Office of Special Education and Rehabilitative Services, Grant #H023C90149-90.

Student-Problem Analysis:
A Means for Studying Student Responses to Test Items

INTRODUCTION

The Stanford Achievement Test is the most widely used standardized achievement test with hearing impaired students in the United States. Given this widespread use, it is essential that a complete array of scoring services be available to educators to suit the variety of uses for which the Stanford is employed. Utilizing either computer-scoring or hand-scoring, teachers can obtain scores that permit normative comparisons between their students and other hearing impaired children of the same age or hearing children who took the same level of the test.

The Center for Assessment and Demographic Studies (CADS) at Gallaudet University has pioneered the use of the Stanford Achievement Test with hearing impaired students (Allen, 1984, 1986; Allen, White, & Karchmer, 1983; DiFrancesca, 1972; DiFrancesca & Carey, 1972; and Trybus & Jensema, 1975). In the last 20 years, CADS has normed the 6th, 7th, and 8th editions of the Stanford Achievement Test with national samples of hearing impaired students and has designed special test procedures for administering the Stanford.

In spite of the widespread use of the Stanford and the availability of the computerized student reports generated by CADS, teachers have often noted the need for ways to obtain more diagnostic information from their students' Stanford results. In response to this need, CADS provides the Student-Problem (S-P) Analysis (Harnisch & Linn, 1981) to programs that order computer score reports from CADS. This analysis is a means for systematically examining the responses of students to test items. In developing the S-P reports, CADS collaborated with Dr. Delwyn Harnisch at the University of Illinois at Urbana-Champaign. S-P reports are generated through the Student-Problem Package (SPP) computer program (Harnisch, Kuo, & Torres, 1983).

The purpose of this paper is to describe the basic theory behind the development and use of an S-P report and to present an annotated example from actual output of the S-P Analysis. Various indicators of student performance, such as the caution index, are discussed. In addition, possible applications and uses for classroom teachers, diagnosticians, and administrators are suggested.

OVERVIEW OF S-P ANALYSIS

As the name implies, S-P reports analyze the Stanford test results considering both students and individual test problems or items. The S-P reports provide a visual display of both the students and the item responses simultaneously, allowing for an in-depth evaluation of a given testing situation. The development of S-P analysis begins with the following observation: although two students may receive the same raw score on a test, they do not necessarily have the same set of skills. Thus, when educators attend only to raw or normed scores (e.g., the percentile rank), they ignore a wealth of information about test performance contained in the actual item responses of the students. On a math test, for example, one student may have answered all of the addition items correctly (and none of the subtraction), while another student may have answered correctly all of the subtraction items (and none of the addition). S-P analysis allows for the correct evaluation of these two students' abilities.

Another aspect of S-P analysis is that item performance is analyzed only for those students in a particular classroom or school; therefore, S-P analysis does not involve normed comparisons, and evaluation of performance is not influenced by comparisons to children from other programs with different curricula. The reports rank students according to the number of items they answered correctly, from highest to lowest; the individual test items are sorted according to those which were the easiest for the group to those that were most difficult. In addition, test items are grouped into content categories. For example, on the Math Computation subtest at the Primary 2 level, the items are grouped into three categories: Addition with Whole Numbers, Subtraction with Whole Numbers, and Multiplication with Whole Numbers.

Teachers can examine each student's performance on individual items or on clusters of items within a content category. Since the reports also provide information on specific distractor or incorrect responses given by students, teachers may more easily identify how or why students gave incorrect answers to particular items. The reports also make it easier to identify students who have low scores because they were unable to finish the test and those who may have copied answers from other students.

DEVELOPMENT OF AN S-P REPORT

Step 1: Ranking Students by Overall Performance

S-P reports show the individual student performance in the context of the total performance of the group of students in the class (or program) who took the same level of the Stanford. In the simplified example in Figure 1, ten children were tested on five test items. The ten children are ranked from highest to lowest in terms of the number of items answered correctly. In the answer grid, the digit "1" represents a correct answer and "0" an incorrect answer. John answered all five items correctly and is at the top of the list, while Jerry, who answered only one item correctly, is at the bottom.

Figure 1
Student-Problem Table Generation

	STUDENT	1	2	3	4	5	SCORE
Student with highest score	John	1	1	1	1	1	5
	Sue	1	1	1	1	0	4
	Jose	1	1	0	1	1	4
	Mike	1	1	1	0	0	3
	Luke	1	1	0	1	0	3
	Stan	1	1	1	0	0	3
	Emmy	1	0	1	0	1	3
	Vera	1	0	1	0	1	3
	Carlos	0	0	1	0	1	2
Student with lowest score	Jerry	1	0	0	0	0	1
		9	6	7	4	5	

Note: 1 = Correct
0 = Incorrect

No. of students answering each item correctly

Step 2: Ranking the Items by Difficulty

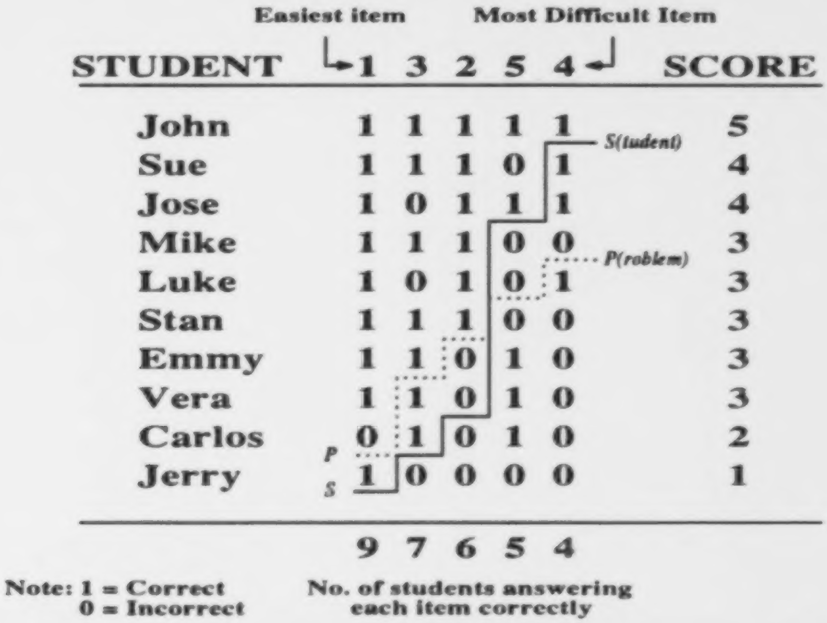
The second step is to rank the test items according to how many students answered each correctly. In Figure 2, the test items (represented as columns) have been arranged from the easiest to the most difficult.

The test item numbers appearing at the top of the chart show that Item 1 was the easiest for the group and was answered correctly by nine students, followed by Item 3 which was answered correctly by seven students. Problem 4 was the most difficult, answered correctly by only four students.

Step 3: Drawing the S-P Curves.

After the students and problems have been rearranged, it is possible to evaluate the quality of the test and the match between the test and the curriculum. To facilitate this assessment, Student Curves (S-curves) and Problem Curves (P-curves) are drawn on the S-P chart. The aim of the S-curve is to define ideal response patterns for each student. To draw this line, determine the number of correct answers for each student (the raw score) and count over that number of columns in the chart from left to right. For example, as demonstrated in Figure 2, John answered all five items correctly so a line is started at the upper right corner of the chart. Sue and Jose each had four items correct, so the curve is continued by counting over four columns for these two students. The next five students all answered three items correctly, so the curve is extended down for these students at the third column. Carlos answered two items correctly, and the S-curve is marked at the second column, and Jerry responded correctly to only one item.

Figure 2
Student-Problem Table


Easiest item
Most Difficult Item
S(tudent)
P(roblem)
P
S

STUDENT	1	3	2	5	4	SCORE
John	1	1	1	1	1	5
Sue	1	1	1	0	1	4
Jose	1	0	1	1	1	4
Mike	1	1	1	0	0	3
Luke	1	0	1	0	1	3
Stan	1	1	1	0	0	3
Emmy	1	1	0	1	0	3
Vera	1	1	0	1	0	3
Carlos	0	1	0	1	0	2
Jerry	1	0	0	0	0	1
	9	7	6	5	4	

Note: 1 = Correct
0 = Incorrect

No. of students answering each item correctly

In the ideal test pattern, all the responses above the S-curve would be correct and all those below the line would be incorrect. In this example, as in most test situations, this is not the case. Variations from the ideal patterns can be examined. For example, although five students have the same raw score of 3, the response patterns for these five students vary considerably. Both Mike and Stan answered the three easiest items correctly and missed the two most difficult problems; this is the ideal response pattern. Luke, however, missed the second easiest item, Item 3, and answered correctly the most difficult, Item 4. Similarly, Emmy and Vera answered Item 2 incorrectly but knew the answer to the more difficult question, Item 5. Evaluating item performance with respect to the S-curve is facilitated through the computation of a "caution index." This index is described more fully below.

The P-curve is drawn in a similar manner but is governed by the number of students answering each item correctly. Item 1 was answered correctly by nine students,

Figure 3
Categorized S-P Chart

	Content Category													
	Add				Subtract				Multip[illegible]					
STUDENT	**1**	**3**	**4**	**2**	**6**	**7**	**5**	**8**	**10**	[illegible]	**12**	**11**	**SCORE**	
John	1	1	1	1	1	1	1	0	1	1	1	1	11	
Sue	1	1	1	1	1	1	1	1	0	1	0	0	9	
Jose	1	1	1	1	1	0	0	0	1	1	1	1	9	
Mike	1	1	1	1	0	0	0	0	1	1	1	1	8	
Luke	1	1	1	1	1	1	1	1	0	0	0	0	8	
Stan	1	0	0	1	1	1	0	0	1	1	1	0	7	
Emmy	1	1	1	0	0	1	0	1	1	0	0	0	6	
Vera	1	1	0	0	1	1	1	0	1	0	0	0	6	
Carlos	1	1	0	0	1	1	1	0	1	0	0	0	6	
Jerry	1	1	1	0	1	0	0	1	0	0	0	0	5	
Item Totals ⟶	10	9	7	6	8	7	5	4	7	5	4	3		⟵ Items arranged within category
Category Totals ⟶	32				24				20					

This category analysis provides the teacher with much more detailed information on differential student performance by content area than is obtained through examination of normal scores alone. In the example, Mike and Luke would have the same scaled score and grade equivalent since they obtained the same raw score; yet they show different patterns of ability. With the content category analysis, one sees that Mike is unable to answer any of the subtraction items but is able to get all the multiplication items correct. Luke, on the other hand, responded correctly to all the subtraction items and missed all the multiplication problems. With normed scores it would be erroneously concluded that Mike and Luke have equivalent achievement levels.

Step 5: *Distractor Analysis.*

Finally, S-P reports provide an analysis of distractors (incorrect response patterns); Figure 4 shows an example. This chart is identical to Figure 3 except that all correct responses have been replaced by periods, and all incorrect responses have been replaced by the actual distractors selected by each student.

Figure 4
Categorized S-P Chart with Distractor Analysis

	Content Category												
	Add				Subtract				Multiply				
STUDENT	1	3	4	2	6	7	5	8	10	9	12	11	SCORE
John	.	.	.	.	.	.	.	C	.	.	.	.	11
Sue	.	.	.	.	.	.	.	.	B	.	A	D	9
Jose	.	.	.	.	.	A	E	C	.	.	.	.	9
Mike	.	.	.	.	C	A	B	C	.	.	.	.	8
Luke	.	.	.	.	.	.	.	.	C	A	A	B	8
Stan	.	B	E	.	.	.	E	D	.	.	.	C	7
Emmy	.	.	.	B	A	.	A	.	.	D	O	O	6
Vera	.	.	A	B	.	.	.	D	.	C	A	D	6
Carlos	.	.	A	B	.	.	.	D	.	C	A	D	6
Jerry	.	.	.	B	.	E	A	.	A	A	A	A	5
Item Totals →	10	9	7	6	8	7	5	4	7	5	4	3	← Items arranged within category
Category Totals →	32				24				20				

. = Correct response   A-E = Incorrect response   O = Omitted item

The distractor analysis is useful for answering a number of important questions related to student and class performance on sets of test items. These are -

1. Are students in a class all making the same mistake?
   - In the example, the response pattern to Item 2 reveals that all students who failed to respond correctly selected the distractor "B" as their answer. A look back at the test booklet would reveal to the teacher the nature of the mistake that all of these students made. Such a revelation would have obvious curriculum or teaching implications.
2. Is there a relationship between student ability (as determined by total raw score) and the distractor selected for a particular item?
   - Often, responses to items represent different levels of ability. Students who have little or no skill will tend to make one type of mistake on test items, and students with a moderate amount of skill will make another kind of mistake. Item 8 in the example is an item of this type. The lower achieving students in the group selected "D" as the correct response; the higher achieving students selected "C".
3. Was a particular low score the result of running out of time?
   - In Figure 4, Emmy omitted Items 11 and 12 at the end of the test; both of these items are multiplication items. Therefore, it is not necessarily true that Emmy cannot perform multiplication, even though her raw score for these items indicates a low level of performance.

4. Did students attend appropriately to the test items or did they simply mark the same response for all items?

   - In the example, Jerry responded "A" to all multiplication items. Since these items appear at the end of the test, it is likely that Jerry simply gave up and marked "A" to the last 4 items. Persons interpreting these results should carefully consider whether or not Jerry's response pattern indicates poor capability in multiplication.

5. Have some students copied on the test?

   - Not only did Carlos and Vera answer the same items correctly, they also selected the same distractors to each of their incorrect items. If these two students also sat near each other in the testing situation, then copying is to be suspected. The probability of two students providing identical response patterns, including distractors, is very small.

APPLICATIONS

The Student-Problem reports provide educators with a wealth of information. There are numerous applications which utilize these data to evaluate individual students, programs, and curricula.

First, the S-P reports identify the strengths and weaknesses of individual students. Curriculum areas which are mastered by a particular student and those which require additional review or training can be noted from the categorized S-P charts.

Similarly, program strengths and weaknesses are highlighted by the categorized S-P charts. A teacher can evaluate the skill levels of the entire class in different content areas. This will enable class review time to be directed to those topics not mastered by the group.

A third application permits the identification of "unusual" students, i.e., those assigned a high caution level as indicated by the Modified Caution Index. Reasons for low achieving students answering difficult items correctly need to be considered by teachers. Typically these students make lucky guesses. Similarly, the reasons for high achieving students missing easy items need to be determined. Typically, high scorers who have high caution indices have made careless mistakes. In some cases, however, high achievers may have actually forgotten previously learned material which might require classroom review. Use of the Modified Caution Index can help to target students in need of further assessment.

"Unusual" test items may also be identified through S-P analysis. Those difficult items answered correctly by low achieving students and those easy items missed by the high achievers should be identified. Teachers can determine whether such items are appropriate for the groups of students tested. It is possible, for a group of students, that items are not appropriately measuring what they are intended to measure.

S-P analysis can assist teachers in matching their curriculum to the test content. The category analysis provides a more detailed picture of item responses based on content of the test. If a group of students have incorrectly answered items clustered in one content area, the teacher can determine whether the material has not yet been introduced to the students.

The distractor analysis also assists in locating students who may have low scores for reasons other than non-mastery of the subject. Teachers can identify students who did not complete the test, copied responses, or used a guessing strategy for responding to problems. The distractor analyses can also provide valuable diagnostic information by pinpointing the specific errors made by students on test items.

Finally, the results from S-P analysis can be useful for teachers in preparing students' Individualized Education Programs. The reports may provide information for parent-teacher conferences. Data may also assist educational planners in the selection of curriculum materials.

CONCLUSION

The Student-Problem Analysis reports do not replace the individual student reports currently available for the Stanford Achievement Test. Rather, the S-P reports are an important supplement. They provide a wealth of information on individual student item responses which can be used as an aid to instruction.

It should be emphasized that the usefulness of S-P analysis in interpreting test results is not limited to standardized tests such as the Stanford. Indeed, it was originally created to assist teachers in the construction of classroom tests. To that end, it should be noted that a PC version of the S-P program is available for use in schools.

Currently the S-P reports are available for the Reading Comprehension and Mathematics Computation subtests of Primary 1 through Advanced 2 levels of the Stanford Achievement Test. Reports can only be generated by the CADS scoring service if the test documents are machine-scored in San Antonio. Furthermore, at each level of the test, there must be no fewer than five students in the group and no more than 200 students.

AN ANNOTATED EXAMPLE OF THE S-P ANALYSIS for the 8th Edition Stanford Achievment Test

(Letters correspond to the sample S-P printouts.)

A. Student identification number. This identifier will always be numeric. In the S-P reports the computer assigns a number to each student in the school or group **who took this particular level of the subtest**. The number of students who took this level of the subtest is shown at the top of each page of the report. (A separate "cross-reference list"--not included in this sample--which gives each student's name and computer-assigned number, is also provided to the school.) As shown in the sample on **page ?**, students are arranged in descending order of their raw score performance on the test. Student 91 was the highest scoring student in the group, scoring 30 out of 40 items correct (75%). Student 55 is the lowest scoring student in the group, scoring 11 out of 40 items correct (28%).

B. Test raw score. This is the number of items in the entire subtest answered correctly. In the example, Student 91 answered correctly 30 out of a possible 40 items. The total number of "problems" (test items) in the subtest is shown at the top of each page of the report.

C. Percentage correct. This is the raw score converted to a percentage of the total number of items. In the example, 30 of 40 items is equal to 75 percent.

D. Std Score (Standard Score). Standard scores allow comparisons among different scales with different means and variances. The standard scores appearing on the S-P reports are standardized to a scale with a mean of 50 and a standard deviation of 10. Thus, a student who scores at the mean for the group taking this test will be assigned a standard score of 50. A student who scores one standard deviation above the mean for that group will be assigned a standard score of 60, and so on. These means and standard deviations, like all S-P statistics, are developed in terms of the students and problems (test items) referred to in the report, not according to an external criterion or an external national group.

E. %-ile Rank (Percentile Rank). The %-ile rank in this report is derived from the raw score. It indicates the rank of a student in regard to other students for this particular S-P report. For example, on this sample printout, Student 46 did as well as or better than 83% of the 30 students in this group who took the Stanford Primary 1 Reading Comprehension subtest.

F. Modified Caution Index or MCI (for students). This is a measure of the "unusualness" of the student's response pattern (of correct and incorrect responses). It ranges in value from 0 to 1. A value of 0 indicates an ideal response pattern; the student answered correctly the easiest items in the test and missed all of the most difficult items. (Item difficulty is determined by the group of students--30 students in the example--taking a particular level of the subtest.) Thus, if a student has a raw score of 10 and a caution index of 0, she/he would have answered correctly the 10 easiest items for the group of students taking the subtest. A value of 1 indicates the most unusual possible response pattern; the student missed all of the easiest items in the test and answered correctly the most difficult items. Thus, a student having a raw score of 10 on the subtest with a caution index of 1 would have answered correctly the 10 items that were the most difficult for the group. This would be highly unusual.

In general, a modified caution index of .30 or greater is reason to be cautious about interpreting a student's score. In the case of Student 91, the modified caution index is .32. When we look at the actual item responses of this student, we find that some items were missed that should have been relatively easy for this student, e.g., Item 12. It may be suspected that the errors were the result of carelessness or inadvertence (a "clerical error"), in which case a teacher may or may not wish to take more notice of it. On the other hand, the errors may represent a true gap in his/her knowledge.

G. **Students are assigned a signal if their responses were unusual.** Students flagged with the signal "C" (MCI $\geq$ .30) have response patterns that should be examined carefully.

H. **Problem number.** These are the actual test item numbers in the test booklets. They are read vertically here. In the example, the first item listed is item 5, followed by item 6, followed by item 8, followed by item 12, etc. They have been rearranged in two ways. First, the items belonging to each content category have been grouped together; the short reading passages (SHORT-PASS), two-sentence stories (2SEN), and short reading passages with questions (SHORT-PASS+Q) have each been grouped together. Also, within each content category, the items have been arranged in ascending order of difficulty. Thus, for example, item 5 was the **easiest** "Short reading passages" item, item 11 was the most difficult item in this category, etc.

I. **Content category description.** These are labels that are applied to the content categories. The content categories are, themselves, arranged in ascending order of their difficulty. In the example, the "Short reading passages" items were, as a group, easier than the other two categories; "Short passages with questions" items were the most difficult. This means that students, on average, answered a higher percentage of short reading passages items correctly than the other two categories. (The abbreviations of the content categories used in the Stanford analysis and a description of these categories can be found on pages ?-?? of this booklet.)

J. **Student responses.** Correct responses are represented by a +; incorrect responses are represented by the number of the incorrect response selected. The first response option is shown as 1, the second as 2, the third as 3, and so on. In the example, Student 91 selected the first response option to item 12, which was incorrect. An "O" (omit) indicates a blank answer; an "M" (multiple) indicates the student checked **more than one** answer to an item or question. In scoring, "O"s and "M"s are considered incorrect responses.

SAMPLE

```
CATEGORIZED INDIVIDUAL RESPONSE PATTERN OF Stanford Achievement Test (SAT-8): P1 READING COMPREHENSION

NUMBER OF STUDENTS =    30;  NUMBER OF PROBLEMS =    40


                                                 H        PROBLEM NUMBER
                                %-   MODIFIED
STUDENT TEST SCORE  STD  TILE CAUTION       112 111 11111          33222333333222232234
NUMBER  (RAW)( % ) SCORE RANK IND/SGN   5682909067784531  1234  41517680359326874920
-------------------------------------  ---------------------------------------------
                                                       ITEM DOMAIN
  A     B    C    D    E    F    G      SHORT-PASS      2SEN      SHORT-PASS+Q   I
                                       ---------------------------------------------

   91   30   75   75   98  0.32  C    +++1+++++++1++1+  ++11  ++++2+++++++2+21+3++
   95   26   65   67   95  0.28  -    ++2++++++2+2321+  ++++  +3+++3+++++1++2+3311
   31   25   63   65   90  0.22  -    ++++++++++1++++2  ++1+  1+1++1222++1+22+332+
   71   25   63   65   90  0.25  -    +++1+++++21+1+23  ++1+  +++++3+++2+111+++311
   46   23   58   62   83  0.23  -    +++1++++3++++313  +11+  ++1++++33+21++2133+2
   52   23   58   62   83  0.22  -    +++3++3++++++223  +++1  1++++11++221+1+12+22
   62   20   50   56   75  0.30  C    1++3+++1+++2132+  +++1  +3++231++2+21++12321
   75   20   50   56   75  0.18  -    +++3+++++++23323  +++1  1+1+33+++22+12+22211
  109   20   50   56   75  0.29  -    1+++++++1+1+3+++  ++++  13++211322311121+3+1
   66   18   45   52   65  0.39  C    +++1+33++2+0++23  1131  3++3+++231+2+222+32+
   77   18   45   52   65  0.18  -    +++3+++++2+2+223  +++2  +3+32312222+12+1+211
   79   18   45   52   65  0.34  C    +++1+1++12+2+++2  +1++  3113+3+32+32221+322+
   38   17   43   50   55  0.34  C    ++++3+3+131+++23  +311  31++331+323+12+02++1     J
   42   17   43   50   55  0.38  C    ++2+313132213++3  ++++  +31+3+++3+++12213221
  113   17   43   50   55  0.21  -    +++++++++2+13323  1++1  13+13+2232321++1+322
   68   16   40   48   47  0.47  C    131+21+3++1+3++2  ++1+  +33131+2++22+11223+2
   74   16   40   48   47  0.10  -    +++++1++++++3+13  +311  +3132+1332+112122312
   58   15   38   46   42  0.28  -    ++++3+213++++22+  +11+  11113+13222+11223+21
   56   14   35   44   35  0.26  -    ++1+++311+123223  1++2  +++10+122121222+321+
   60   14   35   44   35  0.35  C    ++2+2331+31233++  11+1  +++++3+2M131+2223221
   70   14   35   44   35  0.41  C    +31+3+2+1+22++2+  11++  1+11+00+210112203+10
   59   13   33   42   27  0.30  C    +2+3332+++++3222  2+11  ++31+12231+22+223310
   61   13   33   42   27  0.53  C    32113+31+22+33+3  ++12  3+30+023++++212233+1
   67   12   30   40   20  0.42  C    3+2+2+311321+3+3  13+1  ++1+3313++3222223+22
   69   12   30   40   20  0.22  -    ++++21+3332132+2  +31+  ++313+223232211+2222
   57   11   28   38    8  0.40  C    322++3+33+1+1213  2112  1++1+++331M122+12222
   73   11   28   38    8  0.41  C    +32++321+21+132+  +111  13+3212+22212+213+21
   80   11   28   38    8  0.16  -    +++++12+1++++322  1112  00332000000+11002000
   82   11   28   38    8  0.42  C    132+3++31+22+222  13+1  +1132+23++221+222212
   55   11   28   38    8  0.39  C    +++131+3121233+3  111+  +1012+22222++22+3221
```

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K. Problem Numbers. These are the test item numbers in the test booklets. They are arranged in ascending item difficulty, **within each content category.**

L. Problem total. This represents the number of students answering each item correctly. For example, 23 out of 30 students tested answered item 5 (the easiest "Short reading passages" item) correctly. The items are listed in order of their difficulty within each content category.

M. Percent correct. This converts the number answering each item correctly to a percentage of the number of students taking the test. For example, 23 of 30 on item 5 represents 77%.

N. Modified Caution Index or MCI (for items). This has a similar interpretation as the modified caution index for students. It ranges from 0 to 1; an item MCI of 0 indicates an item that was answered correctly by the students with the highest raw scores and incorrectly by all of the students with the lowest raw scores. An item MCI of 1 indicates the greatest amount of caution for an item; i.e., the highest achieving students answered the item incorrectly while the lowest achieving students answered the item correctly. In the sample below, the .42 obtained by item 17 indicates a high level of caution. (Again, a caution index of .30 or greater is commonly used as a criterion for determining items about which we should be cautious.)

O. Some items are assigned a signal. "C" indicates an item with a high level of caution (MCI $\geq$.30).

```
CATEGORIZED INDIVIDUAL RESPONSE PATTERN OF Stanford Achievement Test (SAT-8): P1 READING COMPREHENSION

NUMBER OF STUDENTS =    30;   NUMBER OF PROBLEMS =    40


ITEM DOMAIN                               SHORT-PASS      2SEN      SHORT-PASS+Q


PROBLEM NUMBER                              112 111 11111          33222333333222232234
                                   K    5682909067784531   1234   41517680359326874920



PROBLEM TOTAL                           221111111111111   1111   1111111111
                                   L    3398887766443108   9542   65432210000988876665



PERCENT CORRECT

                                        7766665555444332   6544   55444433333322222221
                                   M    7730007733773737   3070   30730073333077730007



MODIFIED CAUTION INDEX                  0000000000000000   0000   00000000000000000000
                                        ................   ....   ....................
                                        2127112124254264   1143   44303622332534442733
                                   N    6131585232600852   1667   51096064154661148192



MODIFIED CAUTION SIGNAL            O    ---C-----C-CC-CC   --CC   CCC-CC--CC-CCCCC-CCC
```

P. **Student summary statistics** are presented in this table. These include means and standard deviations of raw scores and caution indices for each of the content categories and for the total test.

Q. **Problem summary statistics** are presented in this table.

R. **Test summary statistics** are presented in this table. The reliability coefficient, using Cronbach's formula, is a measure of internal consistency.

```
CATEGORIZED INDIVIDUAL RESPONSE PATTERN OF Stanford Achievement Test (SAT-8): P1 READING COMPREHENSION

NUMBER OF STUDENTS =    30;   NUMBER OF PROBLEMS =    40



ITEM DOMAIN  =====================>  SHORT-PA     2SEN SHORT-PA      ALL
                                     --------     ---- --------    ITEMS

 *******  STUDENT SUMMARY  *******

AVERAGE RAW SCORE                        8.50     2.00      6.53    17.03

STANDARD DEVIATION OF RAW SCORE          2.74     1.17      2.99     5.17

AVERAGE PERCENT OF ITEMS CORRECT (%)    53.13    50.00     32.67    42.58     P

AVERAGE MODIFIED CAUTION INDEX           0.31     0.28      0.38     0.31

STANDARD DEVIATION OF MODIFIED           0.17     0.33      0.15     0.10
    CAUTION INDEX



 *******  PROBLEM SUMMARY  *******

AVERAGE ITEM DIFFICULTY (%)             53.13    50.00     32.67    42.58

STANDARD DEVIATION OF ITEM               0.14     0.10      0.11     0.15
    DIFFICULTY
                                                                              Q
AVERAGE MODIFIED CAUTION INDEX           0.29     0.14      0.33     0.34

STANDARD DEVIATION OF MODIFIED           0.17     0.07      0.15     0.16
    CAUTION INDEX



 *******   TEST SUMMARY    *******

AVERAGE OVERALL STUDENT                 53.13    50.00     32.67    42.58
    PERFORMANCE ON TEST (%)                                                   R

RELIABILITY COEFFICIENT                  0.54     0.39      0.56     0.69
    (CRONBACH'S ALPHA)
```

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I+C	**INFERENTIAL AND CRITICAL COMPREHENSION** Demonstrate the ability to draw conclusions from explicit and implicit information. MAIN IDEA DRAW CONCLUSIONS CAUSE AND EFFECT INFERRED MEANINGS Demonstrate the ability to synthesize and evaluate explicit and implicit information. AUTHOR'S MEANING WRITING STYLE/STRUCTURE

MATHEMATICS COMPUTATION

Primary 1

ADD-WHOLE#	**ADDITION WITH WHOLE NUMBERS** Demonstrate the ability to add whole numbers with no renaming. ADDITION FACTS ADDITION, NO RENAMING
SUB-WHOLE#	**SUBTRACTION WITH WHOLE NUMBERS** Demonstrate the ability to subtract whole numbers with no renaming. SUBTRACTION FACTS SUBTRACTION, NO RENAMING

Primary 2

ADD-WHOLE#	**ADDITION WITH WHOLE NUMBERS** Demonstrate the ability to add whole numbers with and without renaming. ADDITION FACTS ADDITION, NO RENAMING ADDITION, RENAMING
SUB-WHOLE#	**SUBTRACTION WITH WHOLE NUMBERS** Demonstrate the ability to subtract whole numbers with and without renaming. SUBTRACTION FACTS SUBTRACTION, NO RENAMING SUBTRACTION, RENAMING
MUL-WHOLE# or **MUL-WH**	**MULTIPLICATION WITH WHOLE NUMBERS** Demonstrate the ability to name the products for basic multiplication facts with products less than or equal to 25. MULTIPLICATION FACTS
DIV-WHOLE# or **DIV**	**DIVISION WITH WHOLE NUMBERS** Demonstrate the ability to name the quotient for basic division facts with dividends less than or equal to 25. DIVISION FACTS

Primary 3

ADD-WHOLE#	**ADDITION WITH WHOLE NUMBERS** Demonstrate the ability to add whole numbers with and without renaming. ADDITION, NO RENAMING ADDITION, RENAMING
SUB-WHOLE#	**SUBTRACTION WITH WHOLE NUMBERS** Demonstrate the ability to subtract whole numbers with and without renaming. SUBTRACTION, NO RENAMING SUBTRACTION, RENAMING
MUL-WHOLE#	**MULTIPLICATION WITH WHOLE NUMBERS** Demonstrate the ability to name the products or missing factors for multiplication facts and multiply two- and three-digit numbers by numbers less than ten. MULTIPLICATION FACTS MULTIPLICATION WITH ONE-DIGIT MULTIPLIERS
DIV-WHOLE# or **DIV-W**	**DIVISION WITH WHOLE NUMBERS** Demonstrate the ability to name the quotients for division facts and divide two-digit numbers by numbers less than ten. DIVISION FACTS DIVISION WITH ONE-DIGIT DIVISORS

Intermediate 1

A+S-WHOLE#	**ADDITION AND SUBTRACTION WITH WHOLE NUMBERS** Demonstrate the ability to add and subtract whole numbers with and without renaming, and name the missing addends in addition sentences. ADDITION, WHOLE NUMBERS SUBTRACTION, WHOLE NUMBERS
MUL-WHOLE#	**MULTIPLICATION WITH WHOLE NUMBERS** Demonstrate the ability to name the products for multiplication facts with products greater than 25, and multiply two- and three-digit numbers by one- and two-digit multipliers. MULTIPLICATION FACTS MULTIPLICATION, ONE-DIGIT MULTIPLIERS MULTIPLICATION, TWO- AND THREE-DIGIT NUMBERS
DIV-WHOLE#	**DIVISION WITH WHOLE NUMBERS** Demonstrate the ability to name the quotients for division facts with quotients greater than 25, and divide two- and three-digit numbers by one- and two-digit divisors. DIVISION FACTS DIVISION, ONE- AND TWO-DIGIT DIVISORS
AS-DEC	**ADDITION AND SUBTRACTION WITH DECIMALS** Demonstrate the ability to add and subtract with decimals. ADDITION, DECIMALS SUBTRACTION, DECIMALS
AS-F	**ADDITION AND SUBTRACTION WITH FRACTIONS** Demonstrate the ability to add and subtract fractions with like denominators and no renaming.

Intermediate 2

CMP-WHOLE#	**COMPUTATION WITH WHOLE NUMBERS** Demonstrate the ability to add, subtract, multiply, and divide with whole numbers.

	ADDITION AND SUBTRACTION, WHOLE NUMBERS MULTIPLICATION, WHOLE NUMBERS DIVISION, WHOLE NUMBERS
CMP-DEC	**COMPUTATION WITH DECIMALS** Demonstrate the ability to add, subtract, and multiply with decimals. ADDITION, DECIMALS SUBTRACTION, DECIMALS MULTIPLICATION, DECIMALS
CMP-FRAC	**COMPUTATION WITH FRACTIONS** Demonstrate the ability to add, subtract, and multiply with fractions. ADDITION, FRACTIONS SUBTRACTION, FRACTIONS MULTIPLICATION, FRACTIONS
N+PR or **N+P**	**NUMBER SENTENCES AND PROPORTIONS** Demonstrate the ability to solve number sentences and proportions.

Intermediate 3

CMP-WHOLE#	**COMPUTATION WITH WHOLE NUMBERS** Demonstrate the ability to add, subtract, multiply, and divide with whole numbers. ADDITION AND SUBTRACTION, WHOLE NUMBERS MULTIPLICATION, WHOLE NUMBERS DIVISION, WHOLE NUMBERS
CMP-DEC	**COMPUTATION WITH DECIMALS** Demonstrate the ability to add, subtract, multiply, and divide with decimals. ADDITION AND SUBTRACTION, DECIMALS MULTIPLICATION, DECIMALS DIVISION, DECIMALS
CMP-FRAC	**COMPUTATION WITH FRACTIONS** Demonstrate the ability to add, subtract, multiply, and divide with fractions. ADDITION, FRACTIONS SUBTRACTION, FRACTIONS MULTIPLICATION, FRACTIONS DIVISION, FRACTIONS
N+PR	**NUMBER SENTENCES AND PROPORTIONS** Demonstrate the ability to solve number sentences and proportions.

Advanced 1

CMP-WHOLE#	**COMPUTATION WITH WHOLE NUMBERS** Demonstrate the ability to add, subtract, multiply, and divide with whole numbers. ADDITION AND SUBTRACTION, WHOLE NUMBERS MULTIPLICATION, WHOLE NUMBERS DIVISION, WHOLE NUMBERS
CMP-DEC	**COMPUTATION WITH DECIMALS** Demonstrate the ability to add, subtract, multiply, and divide with decimals. ADDITION AND SUBTRACTION, DECIMALS MULTIPLICATION, DECIMALS DIVISION, DECIMALS
CMP-FRAC	**COMPUTATION WITH FRACTIONS** Demonstrate the ability to add, subtract, multiply, and divide with fractions. ADDITION, FRACTIONS SUBTRACTION, FRACTIONS MULTIPLICATION, FRACTIONS DIVISION, FRACTIONS
PCT	**COMPUTATION WITH PERCENT** Demonstrate the ability to compute with percent.
EQ+PROP or **EQ+PRO**	**EQUATIONS AND PROPORTIONS** Demonstrate the ability to solve equations and proportions.

Advanced 2

CMP-WHOLE#	**COMPUTATION WITH WHOLE NUMBERS** Demonstrate the ability to add, subtract, multiply, and divide with whole numbers. ADDITION AND SUBTRACTION, WHOLE NUMBERS MULTIPLICATION, WHOLE NUMBERS DIVISION, WHOLE NUMBERS
CMP-DEC	**COMPUTATION WITH DECIMALS** Demonstrate the ability to add, subtract, multiply, and divide with decimals.
CMP-FRAC	**COMPUTATION WITH FRACTIONS** Demonstrate the ability to add, subtract, multiply, and divide with fractions. ADDITION, FRACTIONS SUBTRACTION, FRACTIONS MULTIPLICATION, FRACTIONS DIVISION, FRACTIONS
PCT	**COMPUTATION WITH PERCENT** Demonstrate the ability to compute with percent.
EQ+PROP	**EQUATIONS AND PROPORTIONS** Demonstrate the ability to solve equations and proportions.

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APPENDIX E

HEARING IMPAIRED NORMS BOOKLET

APPENDIX F

DRAFTS OF WORKS IN PROGRESS

DRAFT

Demographic and School Program Correlates of Stanford Achievement Test, Eighth Edition, Results with Deaf and Hard of Hearing Students

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Demographic and School Program Correlates of Stanford Achievement Test, Eighth Edition, Results with Deaf and Hard of Hearing Students

Sample

The analyses presented in this paper were completed with a sample of deaf and hard of hearing students selected for a project that produced special norms for the Stanford Achievement Test, 8th Edition (SAT-8). This norming sample was representative of the population of approximately 63,000 deaf and hard of hearing students who receive special education services in schools throughout the United States (U.S. Department of Education, 1989). A data base created through the Annual Survey of Hearing Impaired Children and Youth provided the basis for sampling from this population. During the 1989-1990 school year this data base, maintained by the Gallaudet Research Institute's Center for Assessment and Demographic Studied (CADS), contained demographic and educational information for approximately 47,000 students.

The population of approximately 63,000 deaf and hard of hearing students in special education was further narrowed by considering only a subset of those for whom this norm-referenced achievement test is likely to be appropriate. Students listed in the Annual Survey as having mental retardation as a secondary handicapping condition were, thus, excluded from consideration.

All of the programs in the U.S. that participated in the 1988-1989 Annual Survey were classified by region of the country and by program type. Eight strata were then formed by cross tabulating the four regions of the country and two program types. Based on those eight strata, a proportional stratified sample of programs was selected.

Description of the Variables

Dependent Variables

The dependent variable for the first analysis was scaled scores for the norming sample on the SAT-8 *Reading Comprehension* subtest. For the second analysis, the dependent variable was scaled scores on the SAT-8 *Mathematics Computation* subtest. As in the norming project, scores outside the "measurable range" were eliminated from the analysis (Holt, Traxler, & Allen, 1991). Specifically, the scores that were eliminated were those that hit the "ceiling" of the test (i.e., represented 90% or more correct items) and those that hit the "floor" of the test (i.e., represented scores that could have been obtained by random guessing).

Fixed Independent Variables

Age cohort had 11 levels, ranging from 8 through 17 years of age. Each cohort contained all students in the sample who were the same chronological age, in years, at the time of testing.

Two demographic variables, *gender* and *ethnicity*, were included in the analysis. Four categories of *ethnicity* were used. Those were 'White, non-Hispanic', 'Black, non-Hispanic', and 'Hispanic'.

Hearing loss had three levels. Those were 'less-than-severe', 'severe', and 'profound'.

Two variables representing additional relevant handicapping conditions were included. *Number of additional handicaps* had three levels. Those were 'no additional handicap', 'one additional handicap', and 'two or more additional handicaps'. Two levels of *cognitive handicap* were used. Those were 'no cognitive handicap' and 'one cognitive handicap'.

Alterable Independent Variables

Program type is a combination of two factors--type of school and level of integration with hearing students for academic instruction. (Although the Annual Survey question specifies academic instruction, it does not specify particular academic subjects.) In general, the students who are integrated are those in local schools. Very few students in special schools are even minimally integrated. *Program type* was included at 7 levels. Those were 'local school, integrated 16+ hours per week', 'local school, integrated 11-15 hours per week', 'local school, integrated 6-10 hours per week', 'special school, integrated 1-5 hours per week', 'special school, not integrated', 'local school, integrated 1-5 hours per week', and 'local school, not integrated'.

Mode of classroom communication is closely related to *program type*. Integrated classrooms generally either use only oral communication or use an interpreter to communicate with the deaf and hard of hearing students. Self-contained classrooms serving only deaf or hard of hearing students, whether in special or local schools, generally have a teacher who uses sign communication with the class. Four levels of *mode of classroom communication* were included. Those were 'local school, integrated 6+ hours per week, interpreter in classroom', 'local school, integrated 6+ hours per week, oral communication only', 'special school, not integrated, teacher signs', and 'local school, not integrated, teacher signs'.

Analysis

Analysis of variance was used to determine which of the independent variables had a significant effect ($p < .01$) on each of the dependent variables. Separate analyses were performed with Reading Comprehension scaled scores ($N = 4,514$) and Mathematics Computation scaled scores ($N = 4,387$) as the dependent variables.

Least-squares adjusted means were calculated for the various levels of the significant independent variables for each age cohort. In every case the means were adjusted for the effects of all other independent variables--whether or not they were significant predictors of achievement.

A Scheffe procedure was used to make pairwise comparisons of the adjusted means across age cohorts. Significant differences ($p < .05$) were identified among the levels of each of the independent variables.

Results

The results of the data analysis are presented in Figures 1-15. This series of graphs was produced using the SYGRAPH program of SYSTAT (SYSTAT, Inc., 1990). A distance weighted least squares technique (McLain, 1974) was used to smooth the lines. This technique allows the surface to flex while fitting a locally weighted curve running through the points.

Reading Comprehension

The independent variables with a significant overall effect on Reading Comprehension are: program type, ethnicity, level of hearing loss, gender, and presence of a cognitive handicap. The results of the analysis of the Reading Comprehension scores are presented in Figures 1-9.

The mean scaled scores, by program type (adjusted for ethnicity, hearing loss, gender, additional handicaps, and classroom communication mode) are shown in Figure 1. This graph contains four lines: (1) local schools, integrated 16+ hours per week; (2) local schools, integrated 6-10 hours per week; (3) special schools, not integrated; and (4) local schools, not integrated.

The SAT-8 Reading Comprehension mean scaled scores, by ethnicity (adjusted for program type, hearing loss, gender, additional handicaps, and classroom communication mode) are shown in Figure 2. This graph contains three lines: (1) White, non-Hispanic; (2) Black, non-Hispanic; and (3) Hispanic.

The SAT-8 Reading Comprehension mean scaled scores, by level of hearing

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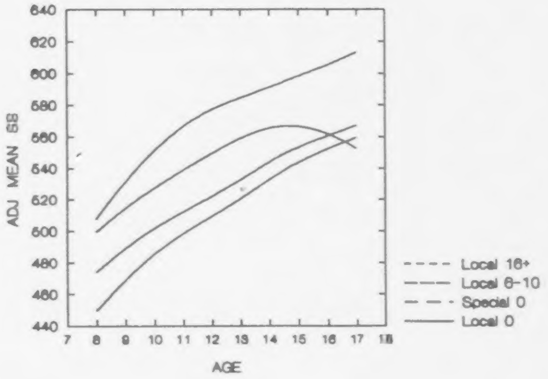
loss (adjusted for program type, ethnicity, gender, additional handicaps, and classroom communication mode) are shown in Figure 3. This graph contains three lines: (1) less-than-severe loss; (2) severe loss; and (3) profound loss.

The SAT-8 Reading Comprehension mean scaled scores, by program type and gender (adjusted for ethnicity, hearing loss, additional handicaps, and classroom communication mode) are shown in Figures 4-6. Local schools, integrated 6+ hours per week are shown in Figure 4; local schools, not integrated are shown in Figure; and special schools, not integrated are shown in Figure 6. Each graph contains two lines: (1) female; and (2) male.

The SAT-8 Reading Comprehension mean scaled scores, by program type and presence of a cognitive handicap (adjusted for ethnicity, hearing loss, gender, and classroom communication mode) are shown in Figures 7-9. Local schools, integrated 6+ hours per week are shown in Figure 7; local schools, not integrated are shown in Figure 8; and special schools, not integrated are shown in Figure 9. Each graph contains two lines: (1) no cognitive handicap; and (2) one cognitive handicap.

Figure 1

SAT-8 Reading Comprehension mean scaled scores by age and program type (adjusted for ethnicity, hearing loss, gender, additional handicaps, and classroom communication mode)



When pairwise comparisons are made, the overall distance between each pair of lines is significant. Students in local schools who are integrated at least 16 hours per week (an average of more than 3 hours per day) scored higher than those in local schools integrated 6-10 hours per week (an average of 1-2 hours per day). Both groups who were integrated scored higher than those in the two non-integrated groups. Among the non-integrated students, those in special schools scored higher than those in local schools.

Although the overall difference between each of the lines is significant, the shape of the lines is different. Scores for students in special schools and those in local schools, integrated either 16+ hours per week or not at all, increase consistently with age cohort. However, for students in local schools integrated 6-10 hours per week, scores increase to the 14-year-old cohort, then decrease. It is not known for which academic subjects those students are integrated. It is possible that their integration involves reading and English instruction in elementary school, but not in secondary school.

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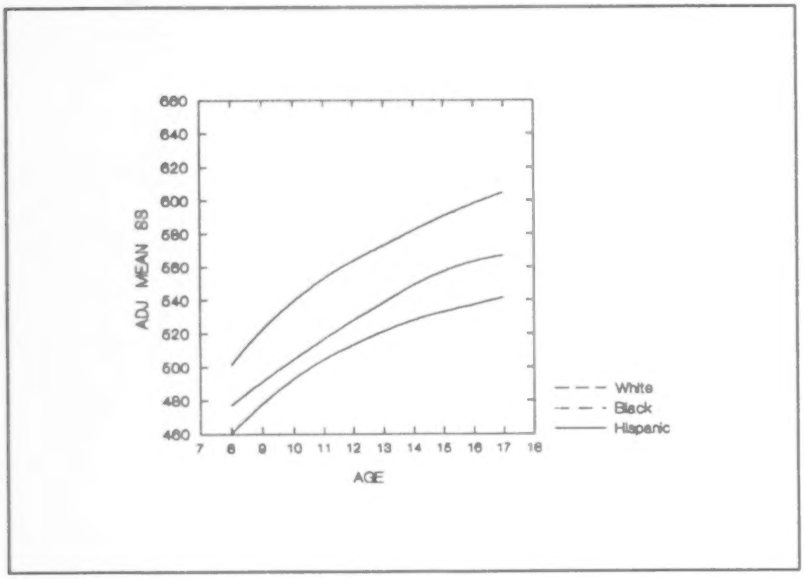
Figure 2

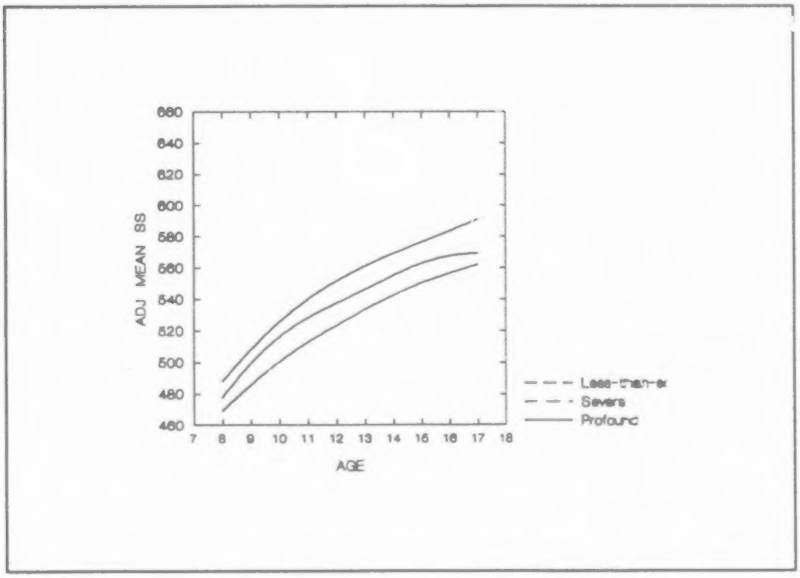
SAT-8 Reading Comprehension mean scaled scores by age and ethnicity (adjusted for program type, hearing loss, gender, additional handicaps, and classroom communication mode)



When pairwise comparisons are made, the distance between each pair of lines is significant. White students scored higher than Black students, who in turn scored higher than Hispanic students. In addition, the gaps between these three ethnic groups tends to widen in the secondary school years.

Figure 3

SAT-8 Reading Comprehension mean scaled scores by age and level of hearing loss (adjusted for program type, ethnicity, gender, additional handicaps, and classroom communication mode)



When pairwise comparisons are made, the distance between each pair of lines is significant. Students with less-than-severe hearing loss scored higher than those with severe loss, who scored higher than those with profound loss.

Although the distance between all lines is significance, the shape of the line representing students with severe hearing loss is slightly more curvilinear than the other two lines. Their scores are closer to those for students with less-than-severe loss at the younger ages and closer to those with profound loss at the older ages.

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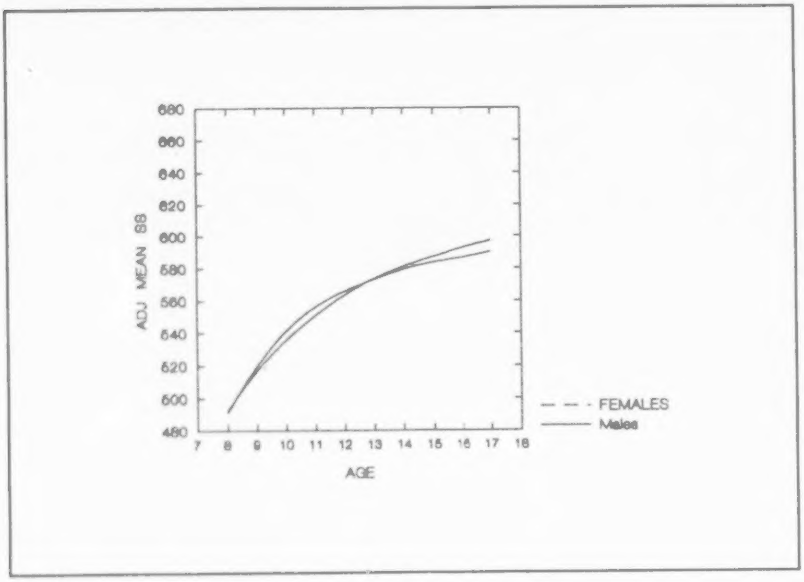
Figure 4

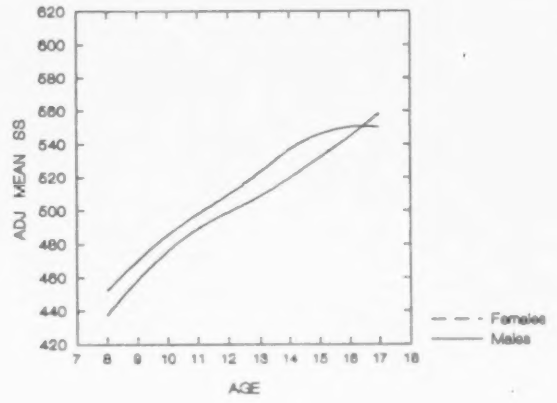
SAT-8 Reading Comprehension mean scaled scores by age and gender for students in local schools, integrated 6+ hours per week (adjusted for ethnicity, hearing loss, additional handicaps, and classroom communication mode)



Overall, females scored significantly higher than males in Reading Comprehension. However, there is no significant difference between females and males in the local schools, integrated 6 or more hours per week.

Figure 5

SAT-8 Reading Comprehension mean scaled scores by age and gender for students in local schools, not integrated (adjusted for ethnicity, hearing loss, additional handicaps, and classroom communication mode)



Overall, females scored overall significantly higher than males in Reading Comprehension. However, there is no significant difference between females and males in the local schools, not integrated.

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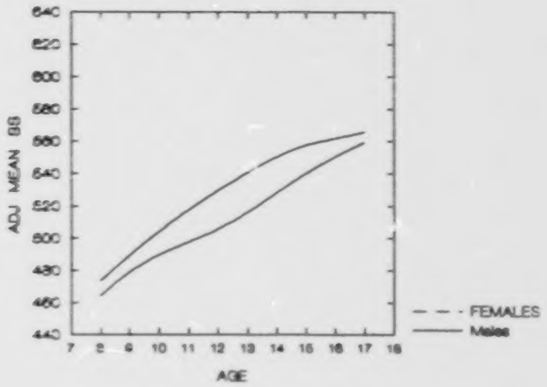
Figure 6

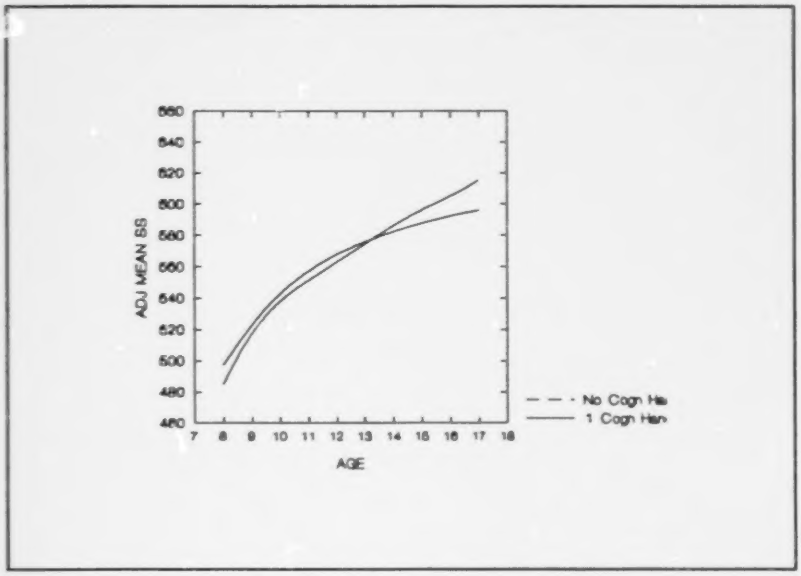
SAT-8 Reading Comprehension mean scaled scores by age and gender for students in special schools, not integrated (adjusted for ethnicity, hearing loss, additional handicaps, and classroom communication mode)



Overall, females scored significantly higher than males in Reading Comprehension. This overall significance difference is also observed for those students in special schools, not integrated.

Figure 7

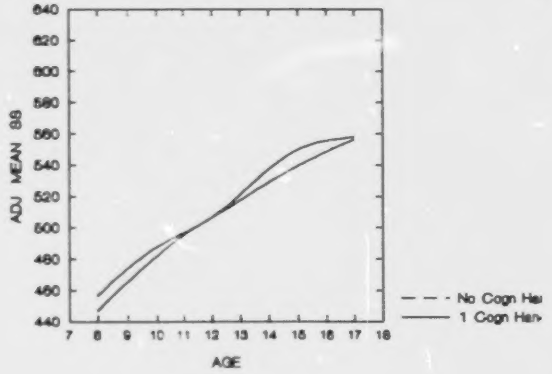
SAT-8 Reading Comprehension mean scaled scores by age and presence of a cognitive handicap for students in local schools, integrated 6+ hours per week (adjusted for ethnicity, hearing loss, gender, and classroom communication mode)



Students without a cognitive handicap scored overall significantly higher in Reading Comprehension than those with a cognitive handicap. However, there is no significant difference between students with and without a cognitive handicap in the local schools, integrated at least 6 hours per week.

Figure 8

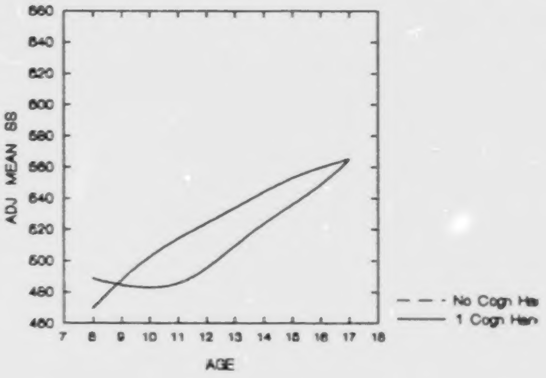
SAT-8 Reading Comprehension mean scaled scores by age and presence of a cognitive handicap for students in local schools, not integrated (adjusted for ethnicity, hearing loss, gender, and classroom communication mode)



Students without a cognitive handicap scored overall significantly higher in Reading Comprehension than those with a cognitive handicap. However, there is no significant difference between students with and without a cognitive handicap in the local schools, not integrated.

Figure 9

SAT-8 Reading Comprehension mean scaled scores, by presence of a cognitive handicap for students in special schools, not integrated (adjusted for ethnicity, hearing loss, gender, and classroom communication mode)



Overall, students without a cognitive handicap scored significantly higher in Reading Comprehension than those with a cognitive handicap. This significant difference is also observed for those students in special schools, not integrated.

Mathematics Computation

The independent variables with a significant overall effect on Mathematics Computation are: program type, ethnicity, classroom communication mode, and presence of a cognitive handicap. The results of the analysis of the Reading Comprehension scores are presented in Figures 10-15.

The SAT-8 Mathematics Computation mean scaled scores, by program type (adjusted for ethnicity, classroom communication mode, additional handicaps, hearing loss, and gender) are shown in Figure 10. This graph contains four lines: (1) local schools, integrated 16+ hours per week; (2) local schools, integrated 6-10 hours per week; (3) special schools, not integrated; and (4) local schools, not integrated.

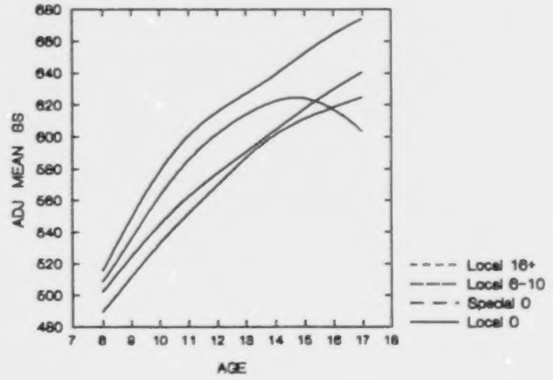
The SAT-8 Mathematics Computation mean scaled scores, by ethnicity (adjusted for program type, classroom communication mode, additional handicaps, hearing loss, and gender) are shown in Figure 11. This graph contains three lines: (1) White, non-Hispanic; (2) Black, non-Hispanic; and (3) Hispanic.

The SAT-8 Mathematics Computation mean scaled scores, by classroom communication mode (adjusted for ethnicity, additional handicaps, hearing loss, and gender) are shown in Figure 12. This graph contains four lines: (1) interpreter in local schools, integrated 6+ hours per week; (2) oral in local schools, integrated 6+ hours per week; (3) teacher signs in special schools, not integrated; and (4) teacher signs in local schools, not integrated.

The SAT-8 Mathematics Computation mean scaled scores, by program type and presence of a cognitive handicap (adjusted for ethnicity, classroom communication mode, hearing loss, and gender) are shown in Figures 13-15. Local schools, integrated 6+ hours per week are shown in Figure 13; local schools, not integrated are shown in Figure 14; and special schools, not integrated are shown in Figure 15. Each graph contains two lines: (1) no cognitive handicap; and (2) one cognitive handicap.

Figure 10

SAT-8 Mathematics Computation mean scaled scores, by program type (adjusted for ethnicity, classroom communication mode, additional handicaps, hearing loss, and gender)



The overall distance between lines 1 and 2 is significant, with students in local schools who are integrated with hearing students at least 16 hours per week scoring higher than those who are integrated 6 to 10 hours per week. The overall distance between lines 3 and 4 is also significant, with non-integrated students in special school scoring higher than those in local schools.

The shape of the line for students in local schools integrated 6-10 hours per week is different than for the other groups. Scores for students in special schools and those in local schools, integrated either 16+ hours per week or not at all, increase consistently with age cohort. However, for students in local schools integrated 6-10 hours per week, scores increase to the 15-year-old cohort, then decrease.

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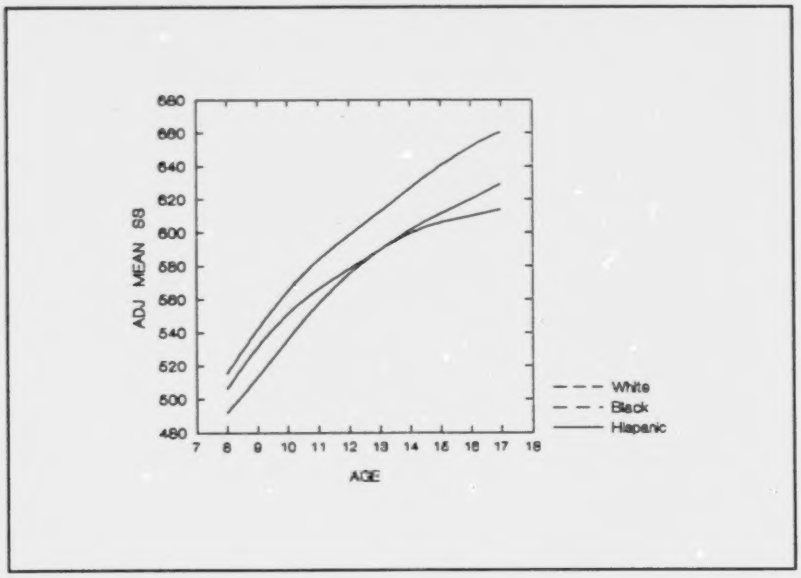
Figure 11

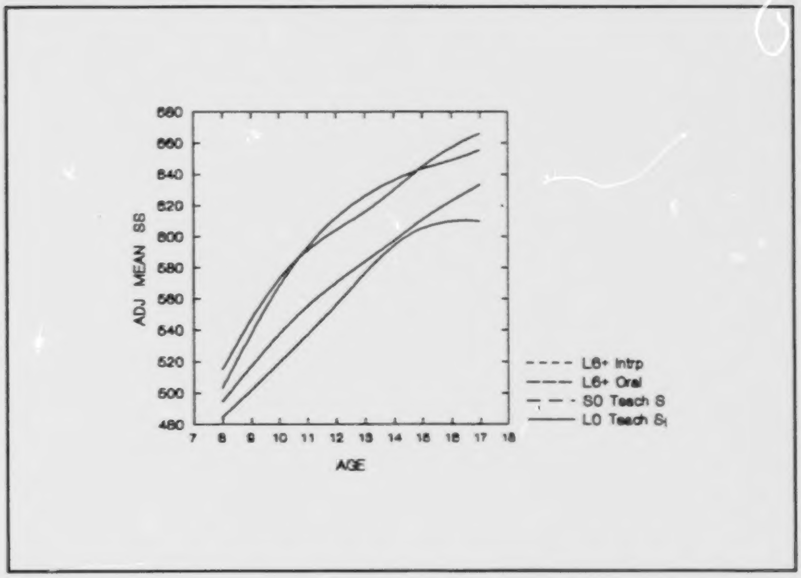
SAT-8 Mathematics Computation mean scaled scores, by ethnicity (adjusted for program type, classroom communication mode, additional handicaps, hearing loss, and gender)



When the pairwise comparisons are made, White students scored significantly higher than Black or Hispanic students. In addition, the gap tends to widen in the secondary school years. The difference between Black students and Hispanic students is not significant.

Figure 12

SAT-8 Mathematics Computation mean scaled scores, by classroom communication mode (adjusted for ethnicity, additional handicaps, hearing loss, and gender)

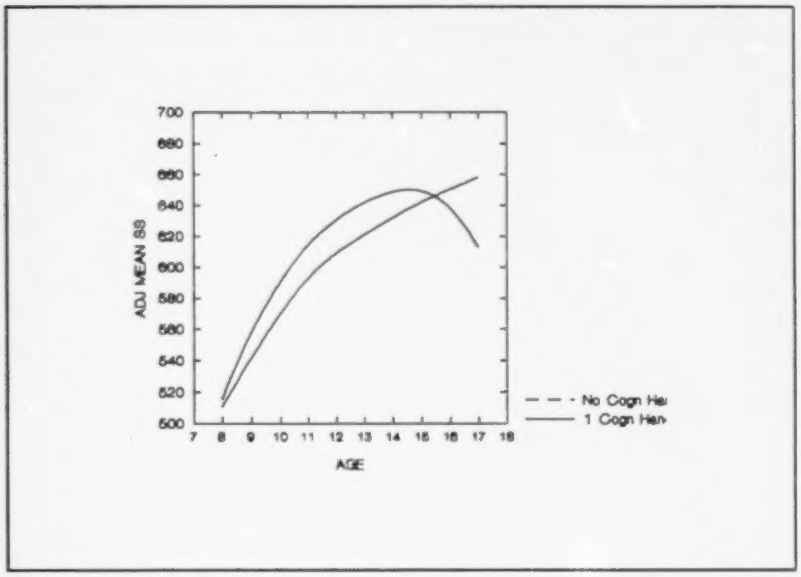


When pairwise comparisons are made, there is no significant difference between oral communication and use of an interpreter in integrated classrooms. However, both of the integrated groups scored significantly higher than the two non-integrated groups whose teachers used sign communication. The overall distance between lines 3 and 4 is also significant, with non-integrated students in special school scoring higher than those in local schools.

All groups show increasing scores throughout the age range, except those in local schools, non-integrated. Scores for this group increase through the elementary school years, then level off during the secondary years.

Figure 13

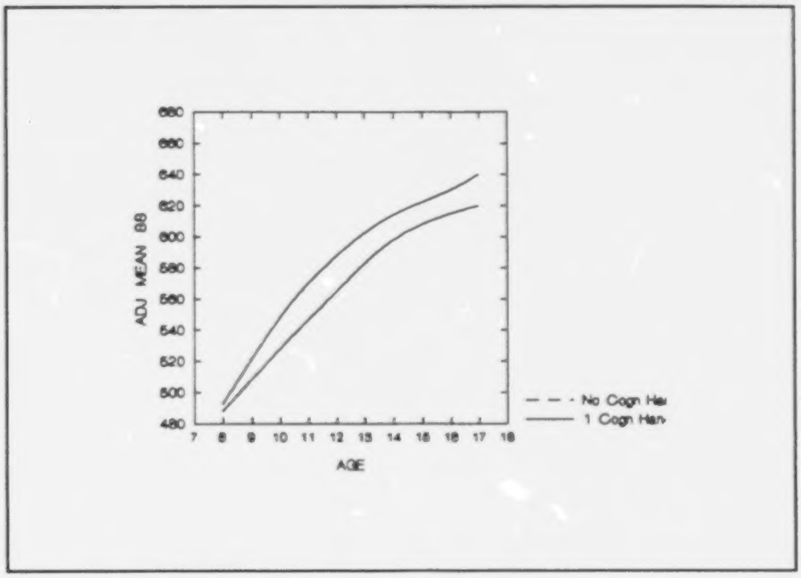
SAT-8 Mathematics Computation mean scaled scores, by presence of a cognitive handicap for students in local schools, integrated 6+ hours per week (adjusted for ethnicity, classroom communication mode, hearing loss, and gender)



Students without a cognitive handicap scored overall significantly higher in Mathematics Computation than those with a cognitive handicap. However, there is no significant difference between students with and without a cognitive handicap in the local schools, integrated 6+ hours per week.

Figure 14

SAT-8 Mathematics Computation mean scaled scores, by presence of a cognitive handicap for students in local schools, not integrated (adjusted for ethnicity, classroom communication mode, hearing loss, and gender)



Students without a cognitive handicap scored overall significantly higher in Mathematics Computation than those with a cognitive handicap. This significant difference is also observed for those students in local schools, not integrated.

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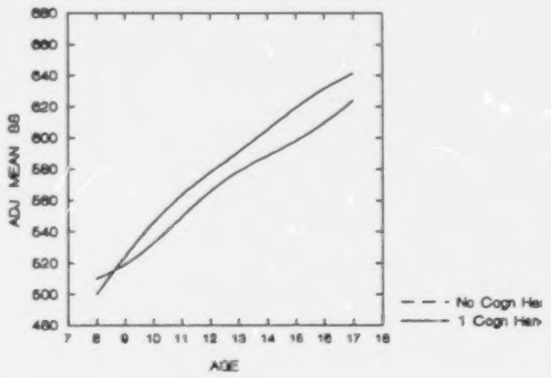
Figure 15

SAT-8 Mathematics Computation mean scaled scores, by presence of a cognitive handicap for students in special schools, not integrated (adjusted for ethnicity, classroom communication mode, hearing loss, and gender)



Overall, students without a cognitive handicap scored significantly higher in Mathematics Computation than those with a cognitive handicap. This significant difference is also observed for those students in special schools, not integrated.

Discussion

All of the means examined in this study were adjusted for the effects of all other independent variables. This was essential because when program type and classroom communication mode were examined in terms of their relation to each of the fixed variables, significant ($p < .01$) relationships were observed. The only fixed independent variable that did not show a significant relationship with program type or communication mode was gender.

Among the White students, 50% were in special schools, 29% were in local schools integrated with hearing students 6 or more hours per week, and 21% were non-integrated in local schools. Among the minority students, however, 40% were in special schools, 18% were in local schools integrated 6 or more hours per week, and 42% were non-integrated in local schools. Among the students integrated in local schools, the White students had 51% interpreters and 49% oral communication, while minority students had 59% interpreters and 41% oral communication. Minority students were most likely to be non-integrated in local schools, while White students were most likely to be placed in special schools. White students in local schools were more likely to be integrated 6 or more hours a week than to be non-integrated.

Among the students with no cognitive handicap, 46% were in special schools, 26% were in local schools integrated with hearing students 6 or more hours per week, and 28% were non-integrated in local schools. Among students with one cognitive handicap, however, 49% were in special schools, 20% were in local schools integrated 6 or more hours per week, and 31% were non-integrated in local schools. Among the students integrated in local schools, the students with no cognitive handicap had 55% interpreters and 45% oral communication, while those with one cognitive handicap had 38% interpreters and 62% oral communicaton. Students in local schools with a cognitive handicap were less likely than those without a cognitive handicap to be integrated with hearing students or, if integrated, to have a classroom interpreter.

Among the students with less-than-severe hearing loss, 16% were in special schools, 51% were in local schools integrated with hearing students 6 or more hours per week, and 33% were non-integrated in local schools. Among the students with severe or profound loss, however, 55% were in special schools, 17% were in local schools integrated with hearing students 6 or more hours per week, and 28% were non-integrated in local schools. Among the students integrated in local schools, those with less-than severe hearing loss had 19% interpreters and 81% oral communication, while those with severe or profound loss had 84% interpreters and 16% oral communication. Students with severe or profound hearing loss were most likely to be placed in special schools, while those with less-than-severe loss were mostly likely to be integrated in local schools with oral communication in the classroom.

Among the students aged 8-12, 36% were in special schools, 23% were in local schools integrated with hearing students 6 or more hours per week, and 41% were non-integrated in local schools. Among the students aged 13-17, however, 55% were in special schools, 26% were in local schools integrated with hearing students 6 or more hours per week, and 19% were non-integrated in local schools. Students aged 8-12 were most likely to be non-integrated in local schools, while those that were integrated were more likely to use oral communication in the classroom. Students aged 13-17 were most likely to be in special schools.

Program type

In general, students who are integrated with hearing students scored higher than those who are not. This was observed for scores that had already been adjusted for the effects of age, ethnic group membership, level of hearing loss, communication mode, gender, and the presence of additional handicaps. However, caution must be observed when interpreting these results. It is still not known whether students achieve more due to integration or whether students are selected for integration based on their higher achievement levels. Notably absent from the analysis is a measure of ability.

When reading and mathematics scores are studied according to the level

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of integration, an interesting difference occurs. In both reading comprehension and mathematics computation, scores increase consistently with age cohort for students either not integrated or integrated 16+ hours per week. However, for students in local schools with a moderate amount of integration (6-10 hours per week), scores show an increase for the elementary school cohorts and a decrease for the secondary school cohorts. It appears that for integration to be effective in local schools, it should be for at least 6 hours per week for elementary schools and at least 16 hours per week for secondary schools.

Among the students who are not integrated with hearing students, those in special scored higher than those in local schools. This was observed for both reading and mathematics achievement.

Three other program types were included in both the reading and the mathematics analyses, but did not show any meaningful results. The group of students integrated 11-15 hours per week in local schools could have been combined with those integrated 6-10 hours, while those integrated 1-5 hours could have been combined with the non-integrated group. In the special schools, the small group of students integrated 1-5 hours per week could have been combined with the non-integrated group. Overall, less than 3% of the students in special schools are even minimally integrated with hearing students.

Ethnic group

This data base does not contain a measure of socioeconomic status. However, there is a high correlation between ethnic group membership and socioeconomic status. In this study, ethnic group membership serves as a surrogate for socioeconomic status.

In general White students scored higher than students in minority groups. In addition, the gaps between the groups tends to widen in the secondary school years. This was observed for scores that had already been adjusted for the effects of age, program type, level of hearing loss, classroom communication mode, gender, and the presence of additional handicaps.

A group of Asian students were also included in the analysis. However, this group was too small to produce interpretable results. Overall, Asian students comprise less than 4% of the norming sample.

Level of hearing loss

Level of hearing loss had a significant effect on reading achievement, but not on mathematics achievement. The effect on reading was observed for scores that had already been adjusted for the effects of age, program type, ethnic group membership, classroom communication mode, gender, and the presence of additional handicaps. In general, the highest scores are associated with the least amount of hearing loss.

Since level of hearing loss and classroom communication mode are closely related, it was theorized that perhaps hearing loss was serving as a substitute for communication mode in the analysis of reading achievement. This theory was tested by observing the effect of communication mode with hearing loss omitted from the analysis. Communication mode still did not have a significant effect on reading achievement.

Classroom communication mode

Mode of classroom communication is closely related to program type. However, it showed a significant effect on mathematics achievement beyond the effect of program type alone. This effect was observed for scores that had already been adjusted for the effects of age, program type, ethnic group membership, level of hearing loss, gender, and the presence of additional handicaps. Students in integrated classes with an interpreter or with oral communication scored higher than those in non-integrated classes with the teachers using sign communication. Among the students in classes with the teachers signing, those in special schools scored higher than those in local schools. Overall, scores increased throughout the age range, except those in local schools non-integrated. Scores for that group increased during elementary school, but leveled off during secondary school.

Since communication mode is also related to level of hearing loss, it was theorized that perhaps it was serving as a substitute for that variable in the analysis of mathematics achievement. This theory was tested by observing the effect of level of hearing loss with communication mode omitted from the analysis. Level of hearing loss still did not have a significant effect on mathematics achievement.

Gender

There was a significant difference between females and males in Reading Comprehension, but not in Mathematics Computation. The effect on reading achievement was observed for scores that had already been adjusted for the effects of age, program type, ethnic group membership, level of hearing loss, classroom communication mode, and the presence of additional handicaps.

Although overall reading scores were significantly higher for females than for males, this gender effect was consistent only for students in special schools. There was no significant difference for students in local schools, whether integrated or not.

Presence of a cognitive handicap

Students without a cognitive handicap scored overall significantly higher in Reading Comprehension and Mathematics Computation than those with a cognitive handicap. The effect was observed for scores that had already been adjusted for the effects of age, program type, ethnic group membership, level of hearing loss, classroom communication mode, and gender.

Although there was an overall significant effect, it was not observed for students in local schools, integrated 6 or more hours per week. For students in local schools, not integrated, the effect was observed only in mathematics achievement. The effect for both reading and mathematics was observed only for the students in special schools.

Where the presence of a cognitive handicap showed a significant effect, it differed between reading and mathematics achievement. The gap between the groups was widest in the middle of the age range for reading and at the upper end of the age range for mathematics.

Recommendations

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Preliminary results:

Three Stanford Normings:

Demographic and Achievement Changes Among Deaf and Hard of Hearing Students, 1974 to 1990

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ABSTRACT

This paper analyzes data from the three norming projects conducted by the Center for Assessment and Demographic Studies in the years 1974, 1983, and 1990. The purpose of these analyses is to assess both the changes in the characteristics of the samples used to compute norms for deaf and hard of hearing students and to examine whether there have been changes in the levels of achievement shown by these students over time.

The analyses are presented in two sections: in the first, the three samples used for computing the norms will be examined. It will be seen that the samples differed considerably on a number of characteristics, reflecting both differences in sampling methods and differences in the populations from which the samples were drawn.

In the second section, an analysis of the achievement patterns in the three years will be presented. In this analysis, all reading and math scaled scores have been placed on the same scale, using conversion tables provided by The Psychological Corporation. Then, regression analysis was employed to examine the effects of a variety of demographic, audiological, and program characteristics across the three norming samples. Of particular interest in this analysis is the effect of norming year on the overall reading and math achievement levels of deaf and hard of hearing students. The analysis reveals significant improvement in achievement levels over the sisteen year period from 1974 to 1990.

Table I: Characteristics of norming samples, 1974, 1983, 1990/

	1974		1983		1990	
Characteristic	N	%	N	%	N	%
Sex						
Male	3106	53%	3556	53%	3117	53%
Female	2745	47%	3120	47%	2740	47%
Ethnic Background						
White, non Hispanic	3909	66%	4446	66%	3357	57%
Black, non Hispanic	916	16%	1182	18%	1031	18%
Hispanic	676	12%	825	12%	826	14%
Asian	87	2%	202	3%	354	6%
Region						
Northeast	890	15%	1456	22%	1022	17%
Midwest	1372	23%	1725	26%	1555	27%
South	2540	43%	2328	35%	1897	32%
West	1064	18%	1186	18%	1383	24%
Hearing Loss						
Less than Severe	1089	19%	1108	17%	1181	21%
Severe	1572	28%	1695	26%	1231	22%
Profound	3020	53%	3820	58%	3117	56%
Additional Handicaps	1345	25%	1522	23%	1269	23%
Cause						
Rubella	1144	23%	1630	25%	304	5%
Heredity	539	11%	846	13%	862	16%
Meningitis	352	7%	515	8%	633	12%
High School Type						
Special School	3598	61%	4209	63%	2963	51%
Local School	2213	39%	2480	37%	2894	49%

Table II: Variables associated with age in norming samples: (+) indicates a tendency for older students to show this characteristic; (-) indicates a tendency for younger students to show this characteristic.

Variable associated with AGE in norming sample:	1974	1983	1990
Being White	+		
Being Hispanic			-
Attending Special School	+	+	+
Having rubella as cause	-	+	+
Having heredity as cause		-	+
Living in South	+		-
Having additional handicaps	-	+	

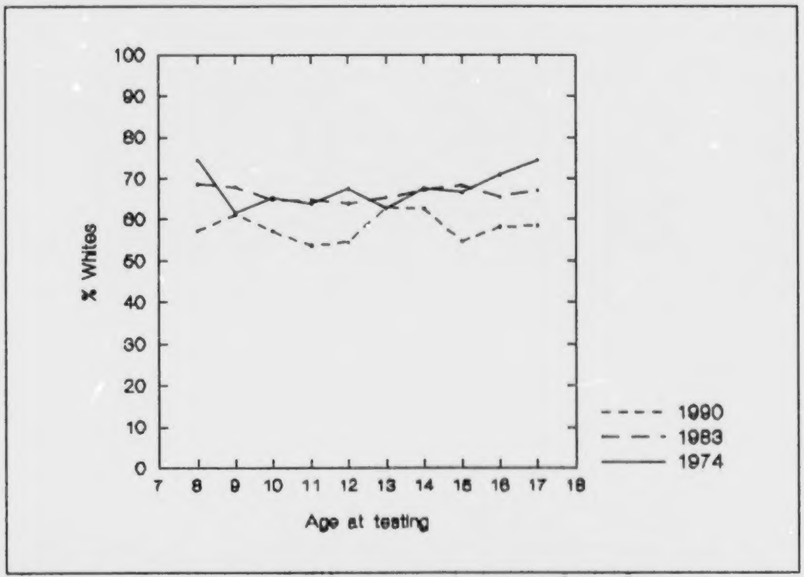

Figure 1: Percentages of three norming samples who were white, 1974, 1983, and 1990

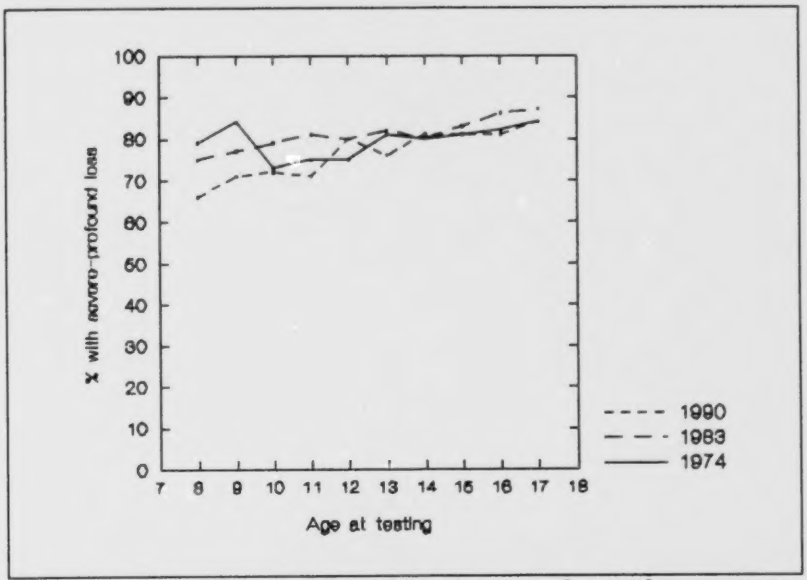

Figure 2: Percentages of three norming samples with severe or profound hearing loss, 1974, 1983, and 1990

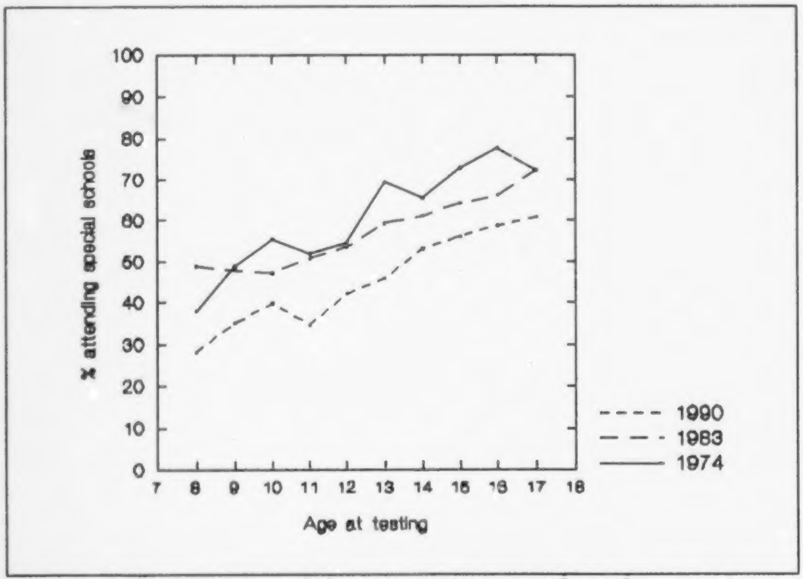

Figure 3: Percentages of three norming samples who were in special schools for the deaf, 1974, 1983, and 1990

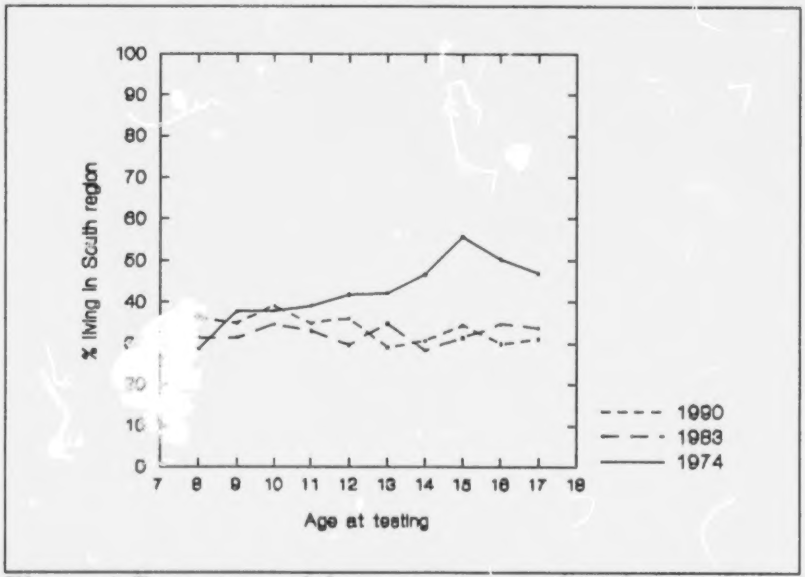

Figure 4: Percentages of three norming samples who were living in the South, 1974, 1983, and 1990

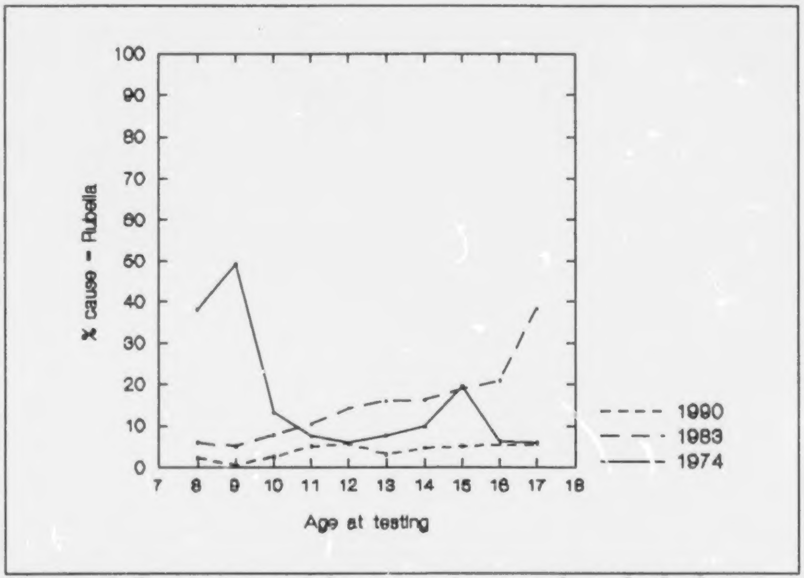

Figure 5: Percentages of three norming samples who had maternal rubella as the cause of deafness, 1974, 1983, and 1990

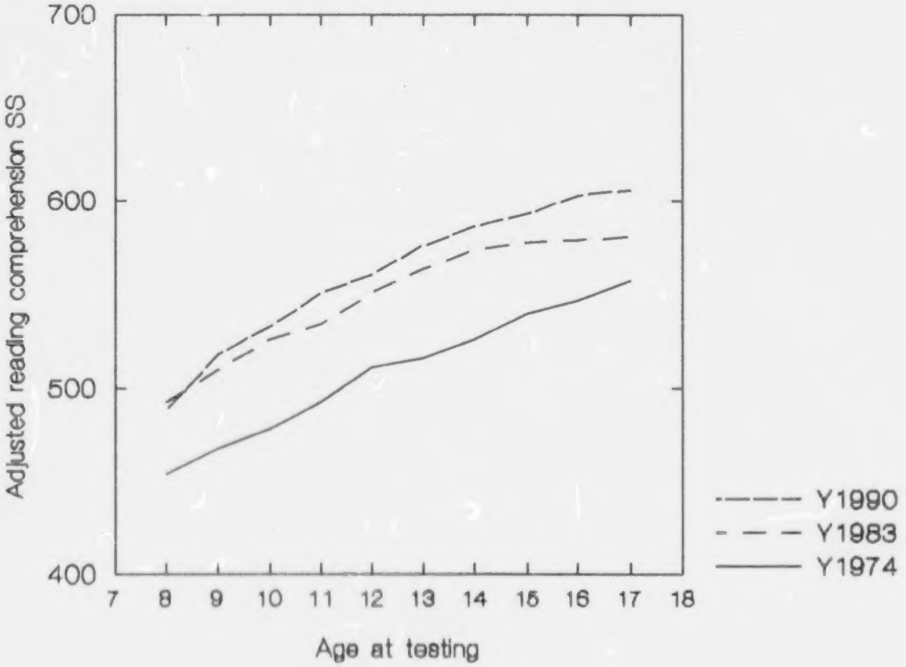

Figure 6: Achievement patterns in reading comprehension, 1974, 1983, and 1990, by age for deaf and hard of hearing students age 8 to 17.

This figure shows the adjusted, age-by-age scaled scores in reading comprehension for the three norming years. It shows the marked improvement in reading performance between 1974 and 1983 and the somewhat smaller (although statistically significant) gains between 1983 and 1990.

Of particular interest is the apparent correlation between age and improvement between 1983 and 1990. Eight year olds in the 1983 and 1990 samples showed nearly identical levels of achievement, while 17 year olds in 1983 outscored 17 year olds in 1990 by an average about 25 scaled score points.

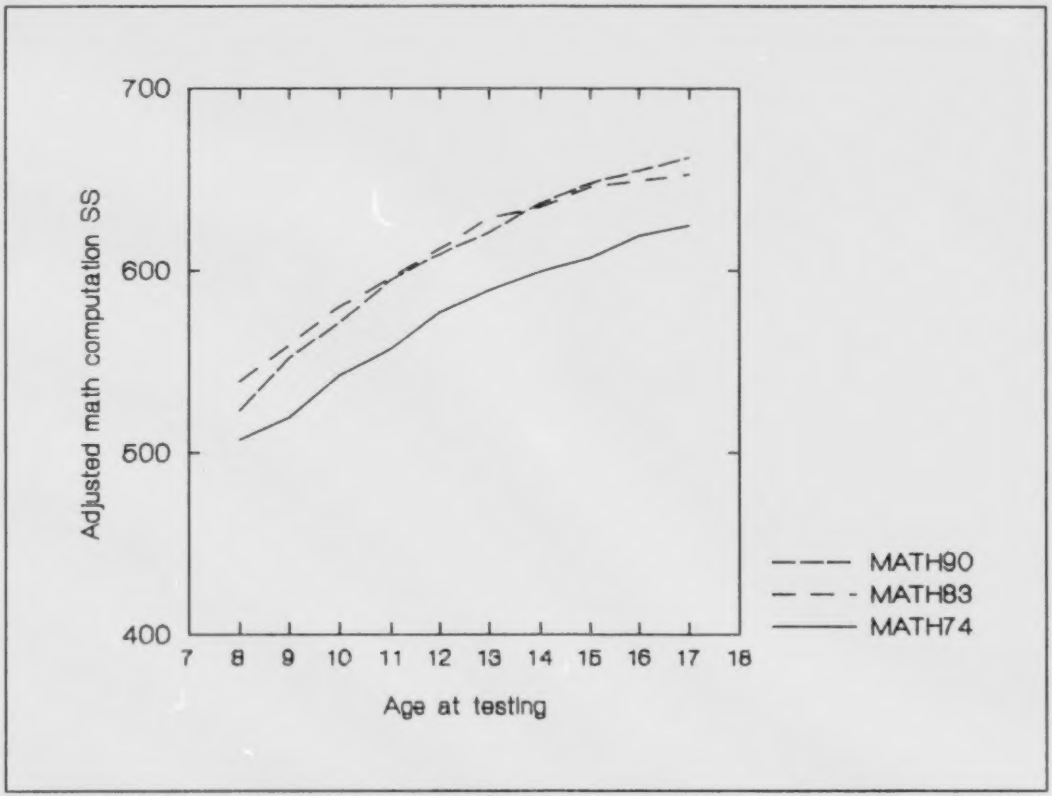

Figure 7: Achievement patterns in mathematics computation, 1974, 1983, and 1990, by age for deaf and hard of hearing students age 8 to 17.

Table III Effects of characteristics...

Effects of individual characteristics on the reading achievement of deaf and hard of hearing students across three norming projects: 1974, 1983, and 1990

All else being equal:

Being WHITE	Adds	32.4 Scaled Score Points
Having HEREDITY as cause	Adds	20.4 Scaled Score Points
Becoming DEAF AFTER TWO	Adds	18.8 Scaled Score Points
Being FEMALE	Adds	13.8 Scaled Score Points
Attending LOCAL schools	Adds	12.6 Scaled Score Points
Living in WEST	Adds	5.3 Scaled Score Points
Living in SOUTH	Subtracts	3.9 Scaled Score Points
Having PREMATURE BIRTH as cause	Subtracts	5.1 Scaled Score Points
Having RUBELLA as cause	Subtracts	5.1 Scaled Score Points
Being BLACK	Subtracts	6.0 Scaled Score Points
Having CEREBRAL PALSY as AHC	Subtracts	11.3 Scaled Score Points
Having SEVERE loss (comp to LTS)	Subtracts	12.7 Scaled Score Points
Having ONE AHC (comp to NONE)	Subtracts	14.7 Scaled Score Points
Having LEARNING DISABILITY as AHC	Subtracts	15.3 Scaled Score Points
Being HISPANIC	Subtracts	15.5 Scaled Score Points
Having PROFOUND loss (comp to LTS)	Subtracts	25.4 Scaled Score Points
Having TWO AHCs (comp to NONE)	Subtracts	29.4 Scaled Score Points

This table shows the mean effects of specific characteristics on the reading achievement of deaf and hard of hearing students. Unless otherwise noted, the comparisons of each effect are between those individuals in the noted category and all others in the sample. For example, whites, summarized across all three norming years, averaged 32.4 scaled score points higher than all nonwhites, including students of many racial and ethnic backgrounds. For some characteristics (noted in parentheses), the effects refer to comparisons to specific subgroups. For example, students with severe hearing loss averaged 12.7 scaled score points below only those students with less than severe loss. Similarly, students with profound loss averaged 25.4 scaled score points below only those with less than severe loss and not to those with severe losses.

These effects were determined in such a way as to statistically control for all other linear effects in the model. The model includes those effects listed plus age and norming year. Thus for example, when evaluating the effect of being white, we have controlled for the effects of all other model variables and can proceed with the assumption that the effects listed are not surrogates for others in the model; i.e., they represent independent statistical effects.

By the same token, the effects do not control for variables that are not in the model. For example, attending a local school is associated with a mean increase of 12.6 scaled score points in reading over those attending special schools. While we have controlled for ethnic differences and differences in the levels of hearing loss between students attending different programs, we have not controlled for any specific curricular or placement differences within these broad program types, e.g., whether students received instruction in integrated classrooms with hearing students. Thus, we cannot conclude any level of causality by the numbers represented in the table.

These effect sizes can be used to construct demograophic profiles of those deaf students who are of greatest risk for academic failure. For example, we would predict that an Hispnic male with two additional handicaps would be of considerably higher risk for academic failure than a White, non Hispanic female whose deafness is attributed to genetic factors. While this comparison might seem trivial, the magnitude of the differences in expected achievement levels for these two groups of students is extremely large and important for educators to consider.

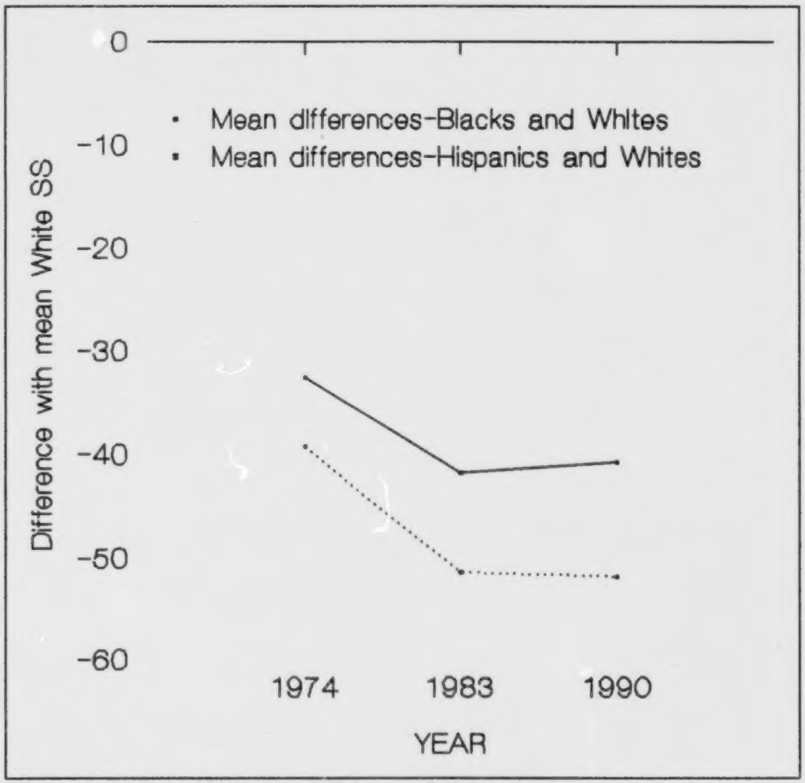

Figure 8: Gaps between White and minority reading achievement levels across three norming projects.

This figure show the gaps between the levels of reading achievement for whites and for Blacks and Hispanics over the three norming periods. It indicates that between the years of 1974 and 1983, the gaps between the achievement levels for blacks and whites widened from an average of 32.6 points to 41.8 points. The gap between whites and Hispanics widened from 39.3 points to 51.4 points. During the interval from 1983 to 1990, the gaps in reading achievement levels between whittes and blacks and between whites and Hispanics remained constant.

DRAFT

Item Analysis of the Stanford Achievement Test, Eighth Edition, with Deaf and Hard of Hearing Students

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Item Analysis of the Stanford Achievement Test, Eighth Edition, with Deaf and Hard of Hearing Students

Carol Bloomquist Traxler

The achievement test most widely used among programs serving hearing impaired students in America today is the Stanford Achievement Test (The Psychological Corporation, 1989). One likely reason for the test's popularity for use with this population is the availability of special norms for hearing impaired students (Center for Assessment and Demographic Studies, 1991). During the standardization of the test on deaf and hard of hearing students, summaries of student performance in global content areas are being reported (e.g., Allen, in preparation; Holt, in preparation; Holt, Traxler, and Allen, 1991). To address in greater detail the specific skills that hearing impaired students have and do not have, the present study provides information on individual items and categories of items and discusses their use as fair measures of the academic skills of deaf and hard of hearing students.

Objectives

Specifically, this study addresses three major objectives:

1) To examine, for selected subtests of the Stanford, test item quality indicators for the test when administered to deaf and hard of hearing students.

2) To compare, for selected subtests of the Stanford, test item characteristics derived from the analysis using responses of hearing impaired students with the item characteristics shown when the same items are administered to hearing students.

3) To examine differential item performance for hearing impaired and hearing students in order to make generalizations about categories of test items or test item formats that will inform instruction and test score interpretation for hearing impaired students and that will serve future test development.

Theoretical Context of the Study

Test item analysis in this study uses methods based in classical test theory and in item response theory. The Rasch latent trait model, employed by the Psychological Corporation in their development of the Stanford Achievement Test, was selected for use in the current analysis of item data for hearing impaired students to obtain test item characteristics which could be compared with those found by the the test publisher in its calibration of the test on a national sample of hearing students. According to Rasch model latent trait theory, when the model accurately characterizes ("fits") a set of data corresponding to the responses of a group of examinees to a set of items, item parameter invariance will result. In other words, item difficulty estimates are expected to be constant, except for random error, for random subsets of the examinees. This group invariance property of the item parameters is a fundamental property of latent trait theory, under which the Rasch model falls (e.g., Baker, 1977, p. 171). If item parameters are not invariant for some of the items, that is, if some items show differences in difficulty for hearing and hearing impaired students, it may mean that those items are measuring different traits for the two groups. In this study differential performance on test items and groups of items is investigated in terms of item parameter invariance for calibrations based on groups of hearing impaired and hearing students. The item difficulty estimates obtained from calibrations using responses of subgroups of hearing impaired students are compared with those reported for hearing students.

Definitions

Some of the terms used in this paper deserve clarification; they will be familiar to those conversant with latent trait literature.

Rasch model: The Rasch model is one of the mathematical models proposed by the Danish mathematician Georg Rasch (1960) for use in the measurement of characteristics of persons (e.g., ability) and test items (e.g., difficulty). Also known as the simple logistic model or the one-parameter model, the Rasch model specifies that the probability of a correct response to an item is a function of the difference between the ability of the person and the difficulty of the item.

Latent trait: A latent trait is an unobservable trait or ability assumed to underlie performance on a test. The amount of the trait or ability (e.g., the level of achievement) that an individual possesses is presumed to determine the number of the items the individual will answer correctly. If the latent trait underlying performance on a test is unidimensional, then only one trait or ability is required to explain test performance. In other words, the test then measures only one ability. One of the assumptions of the Rasch model is that the latent trait be unidimensional. In a Rasch analysis this assumption may be tested.

Item parameter: The Rasch model item parameter is a number indicating an item's difficulty. It signifies the location of an item on the latent trait continuum (or ability scale). Difficulty is defined as the point on that scale at which an examinee of known ability has a 50% chance of answering the item correctly. The metric for the item difficulty estimates reported is logits; this metric refers to an item's natural log odds probability of being answered incorrectly.

Calibration: Calibration is the process by which a difficulty value is estimated for each item and the fit of the items to the model is evaluated. Calibration is usually carried out by computer.

Fit: Model-data fit refers to the extent of the agreement between a theoretical model and the data to which it is fit. During the calibration process, fit values for the test items may be calculated.

Methodology

The analysis that is presented in this paper follows the following general scheme:

a) A Rasch calibration is performed on item data from the norming of the Stanford Achievement Test with hearing impaired students; differences in resulting item characteristics from this calibration and the calibration performed by the Psychological Corporation on data gathered from hearing students are noted.

b) A second calibration is performed which "anchors" certain item characteristics to those obtained from the calibration with hearing students; an assessment of the degree to which this anchoring produces an adequate calibration for the hearing impaired students' item data is provided.

c) Based on a and b, certain items are singled out as having different characteristics between the hearing and hearing impaired student calibrations.

d) Speculations are made as to specific content and test format issues which might "explain" the disparities in the calibrations.

It should be noted at the outset that these explanations are speculative and decidedly *post hoc* in nature. Readers are encouraged to study the test and provide their own explanations. In the text we have referred to particular item numbers from the Stanford battery. Readers are further encouraged to study the specific items referenced by these item numbers. Where appropriate, we have attempted to describe relevant aspects of certain items in order to make our points. We have also compared our results with the 8th Edition with those found for the 7th Edition in Reading Comprehension (Bloomquist and Allen, 1987), Mathematics Computation, and Mathematics Application (Bloomquist and Allen, 1988) subtests.

The test items in the subtests appearing at all eight test levels are examined in this analysis. These subtests are Reading Comprehension, Mathematics Computation, Mathematics Applications, Concepts of Number, Language, and Spelling. Data for all eight test levels are used.

Because the eight test levels were designed to be taken by students in particular grades in school, it was decided for the purpose of examining the quality of the test -- in the reliability and validity analyses reported here -- to limit the test analysis sample to those for whom the test content may be considered to be more age appropriate. While test scores in the measurable range are accurately reported for all students assigned to a test level, an analysis of technical quality of the test itself is more valid when based on a sample of students who are judged appropriately matched in age to the students for whom the test was designed.

Table 1.0 shows the test levels of the SAT-8 with the grade level of test content, the age of hearing students for whom each test level was designed, and the age of the deaf and hard of hearing students in the norming sample and the item analysis sample. For example, the Intermediate 1 level was designed to measure curriculum content commonly taught in grades 4.5 to 5.5, that is, to students who are 9 to 11 years old. For the test analysis sample, we are using that age range, but extending it another three years for hearing impaired students, from 9 to 14. Therefore, the test analysis sample includes all of the hearing impaired students who scored in the measurement range and for whom the test was considered to be relatively age appropriate.

Table 1.2 shows the number of students in the norming sample and the test analysis sample by age and test level for Reading Comprehension and Mathematics Computation. The students who comprised the norming sample were about 90% of those tested at each age 8 through 18; only about 10% of the students did not score in the measurable range. There were age differences in those who were in the analysis sample, however; generally it was the older students who were excluded from the analysis sample. The younger students were more likely to have taken test levels considered more appropriate for their age. In Reading Comprehension, all of the 8-year-olds in the norming sample were included in the analysis sample, while only 38% of the 15-year-olds and 10% of the 18-year-olds were included. In Mathematics Computation, nearly all of the 8-year-olds, 69% of the 15-year-olds, and 31% of the 18-year-olds were included in the analysis sample.

The proportions of the norming sample included in the test analysis sample by age are presented graphically in Figure 1.0 to illustrate the relationship between age and inclusion in the test analysis sample. Approximately 90% of the students at each age from 8 to 18 obtained test scores in Reading Comprehension and Mathematics Computation that were in the measurement range.

These students were included in the norming sample. But some students, especially the older students, were not included in the test analysis sample because the test levels that were assigned them were designed for hearing students more than three years younger. This item analysis examines also the subset of examinees for whom the test content is more likely to be age-appropriate.

Table 1.3 will show the number of students in the test analysis sample, the number of test items for each subtest, and the raw score means and standard deviations at each test level. For all subtests at all levels, there is an adequate number of students in the analysis sample to conduct reliability and validity statistics.

Results

Tables 2.1 through 2.8 will show the results for Reading Comprehension, levels Primary 1 through Advanced 2. Tables 3.1 through 7.8 will show the results for the remaining five subtests, each with eight test levels. The tables show the test items, grouped by item cluster, with the following item statistics: item discrimination (corrected point biserial), item fit (as calibrated on hearing impaired students and as calibrated with difficulty values anchored to those for hearing students), item difficulty (p-values for the entire sample and for selected subgroups), and distractor analysis (proportion of examinees selecting each response or omitting the item). (At this point, sample tables are presented.)

Once the analysis is completed, the plots of Rasch model based difficulty values for the calibrations on hearing and hearing impaired examinees will be presented as bivariate scatterplots. Interpretation of these tables and figures will include comparisons to other studies of this test, as appropriate, especially to the findings using the SAT-7 with hearing impaired examinees.

Implications of the study for test score interpretation, for instruction, and for test construction will be presented in terms of suggestions for test users and test designers.

Implication for Test Score Interpretation

Immplications for Instruction

Implications for Test Development

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Table 1.1
Test Levels with Content Level and Age for Hearing Students, and Age of Hearing Impaired Norming Sample and Test Analysis Sample Stanford Achievement Test, Spring 1990

			HI Students	
	Grade Level of Test Content	Age of Hearing Students	Norming Sample	Test Analysis Sample
Primary 1	1.5 - 2.5	6 - 8	8 - 20	8 - 11
Primary 2	2.5 - 3.5	7 - 9	8 - 20	8 - 12
Primary 3	3.5 - 4.5	8 - 10	8 - 20	8 - 13
Intermediate 1	4.5 - 5.5	9 - 11	8 - 20	9 - 14
Intermediate 2	5.5 - 6.5	10 - 12	9 - 20	10 - 15
Intermediate 3	6.5 - 7.5	11 - 13	10 - 20	11 - 16
Advanced 1	7.5 - 8.5	12 - 14	10 - 20	12 - 17
Advanced 2	8.5 - 9.9	13 - 15	9 - 20	13 - 18

Table 1.2
Students in the Norming Sample and the Item Analysis Sub-sample by Age and Test Level for the Reading Comprehension and Mathematics Computation Subtests
Stanford Achievement Test, Spring, 1990

Reading Comprehension
Test Level

Age	P1	P2	P3	I1	I2	I3	A1	A2	*Total*
8	256	67	21						*344*
9	222	105	59	19	2			1	*408*
10	214	104	83	30	11	7	2	2	*453*
11	170	102	109	56	28	14	16		*495*
12	119	100	94	52	30	26	25	5	*451*
13	76	110	98	53	46	29	33	20	*465*
14	75	89	105	66	49	47	39	37	*507*
15	81	97	99	79	48	43	71	58	*576*
16	60	82	105	91	62	35	82	76	*593*
17	62	62	101	61	71	62	76	87	*582*
18	57	82	107	72	63	54	59	54	*548*
19-20	51	63	69	45	31	36	39	35	*369*
Total	*1443*	*1063*	*1050*	*624*	*441*	*353*	*442*	*375*	*5791*
Total	*862*	*478*	*464*	*276*	*212*	*194*	*326*	*332*	*3144*

Mathematics Computation
Test Level

Age	P1	P2	P3	I1	I2	I3	A1	A2	*Total*
8	189	127	28	3					*347*
9	116	155	96	28	1				*396*
10	81	143	119	69	20	1			*433*
11	49	111	130	101	53	20	6	1	*471*
12	32	81	78	86	81	54	21	11	*444*
13	23	37	89	83	75	67	37	41	*452*
14	11	43	59	78	74	103	55	66	*489*
15	21	29	61	64	69	88	92	132	*556*
16	4	24	33	66	77	97	86	182	*569*
17	9	16	35	43	76	78	114	193	*564*
18	11	22	38	55	63	75	109	168	*541*
19-20	7	8	38	49	48	56	56	125	*387*
Total	*553*	*796*	*804*	*725*	*637*	*639*	*576*	*919*	*5649*
Total	*435*	*617*	*540*	*445*	*372*	*429*	*405*	*782*	*4025*

Note: The item analysis sub-sample is in the shaded area.

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Table 2.3
Summary of Item Statistics, Primary 1, Mathematics Computation, Item Analysis Sample
Stanford Achievement Test, 8th Edition, Spring 1990

Item Number /Cluster	Rasch Statistics		Traditional Statistics						
				P-Values					
					Ethnicity			Hearing Loss	
	Item Fit	Anchored Item Fit	Corrected Point Biserial	All	White	Black	Hispanic	Severe to Profound	Less than Severe
1			.31						
2			.20						
3			.41						
4			.27						
5			.19						
6			.26						
7			.33						
8			.53						
9			.56						
10			.52						
11			.56						
12			.35						
13			.55						
14			.55						
15			.49						
16			.34						
17			.46						
18			.24						
19			.36						
20			.21						
21			.51						
22			.46						
23			.48						
24			.53						
25			.43						
26			.48						

Table 2.3
Summary of Item Statistics, Mathematics Computation, Primary 1, Item Analysis Sample
Stanford Achievement Test, 8th Edition, Spring 1990

Item Number /Cluster	Distractor Analysis														
	All					Less than Severe					Severe-to-Profound				
	a	b	c	d	o	a	b	c	d	o	a	b	c	d	o
1	4	84	6	5											
2	7	6	12	74	1										
3	7	63	9	20	1										
4	32	14	32	19	1										
5	3	40	40	16	2										
6	8	12	51	28	1										
7	60	7	13	17	3										
8	4	8	69	16	3										
9	54	8	9	26	3										
10	9	7	55	24	5										
11	6	64	9	17	3										
12	10	43	12	29	5										
13	13	14	50	19	5										
14	7	54	14	19	6										
15	13	66	8	10	3										
16	5	9	12	70	3										
17	54	10	9	22	5										
18	15	9	45	26	5										
19	9	47	13	26	5										
20	21	34	12	28	4										
21	8	10	48	26	6										
22	6	16	41	29	7										
23	10	42	12	29	7										
24	9	10	54	19	7										
25	49	14	8	22	7										
26	6	46	17	24	8										

Stanford Achievement Test
8th Edition, Form J

Hearing Impaired Norms Booklet

Including Conversions of
Raw Score to:
Scaled Score & Grade Equivalent*
and
Age-based Percentile Ranks for:
all levels of hearing loss
and
severe-profound losses only

Center for Assessment and Demographic Studies
Gallaudet Research Institute
Gallaudet University

February, 1991

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INTRODUCTION

There are two sets of tables in this booklet:

1. The first, on pages 4 - 23, contains the conversion tables for transforming raw scores -- i.e., total number of correct responses for a given subtest -- on the 8th Edition Stanford Achievement Test (SAT-8), Form J, into scaled scores and grade equivalents. (N.B.: due to space limitations, the Listening subtest conversion tables for each test level appear on pages 22 & 23.)

   A. **SCALED SCORES**: these are scores derived from the norming sample of HEARING students who took the SAT-8. They represent approximately equal units on a continuous scale. By the use of scaled scores, it is possible to compare a student's performance in a given subtest (e.g., Reading Comprehension) on one level of the test with that student's performance **in the same subtest or subject area** on another level of the test. Scaled scores are especially suitable for studying change in performance for a given subtest area -- either of an individual or of a class -- from one administration of the test to the next. They are also appropriate for making comparisons between groups on subtests which measure the same skill. **Scaled scores cannot be compared across different subject or skill areas** (e.g., Reading Comprehension cannot be compared with Mathematics Computation), but they may be averaged within the same subtest area -- e.g., to obtain an average for a class in Reading Comprehension.

   An example: a hearing impaired student who answers 27 items correctly on the Primary 2 Reading Comprehension subtest obtains a scaled score of 595 (page 6 of this booklet).

   B. **GRADE EQUIVALENTS**: these scores represent the average performance of HEARING students tested in a given month of the year with a specific subtest of the SAT-8. The SAT-8 grade equivalent scale ranges from K.0 (beginning kindergarten) to 12.9, with scores above 12.9 designated as PHS (post high school); PK stands for pre-kindergarten. A grade equivalent of 6.0 indicates the first month of Grade 6, 6.1 the second month, etc.

   An example: a 15-year-old hearing impaired student who answers 44 items correctly on the Primary 3 Reading Comprehension subtest obtains a grade equivalent of 6.1 (page 8 of this booklet). This Primary 3 subtest was designed to measure the reading skills of **HEARING** students in Grades 3 to 4. The grade equivalent of 6.1 means that the 15-year-old hearing impaired student is reading in a similar fashion as would an average hearing student in the second month of Grade 6 on material designed for Grades 3 to 4. The hearing impaired student is not necessarily reading at the Grade 6 level.

   Grade equivalents are linked to a specific level of the test. They should not be compared from one level of the SAT-8 to another; thus, the grade equivalents of two students who took **different** levels of the SAT-8 **cannot** be compared. Grade equivalents also **cannot** be averaged to obtain a so-called "overall" score (e.g., by averaging the Reading Comprehension and Mathematics Comprehension scores to obtain a single score).

2. The second set of tables in this booklet -- pages 28 - 77 -- contains the age based percentile norms. **Percentile norms compare a hearing impaired student to other hearing impaired students of the same age, regardless of test level taken**. For example, a 17-year-old student who ranks at the 60th percentile in Reading Comprehension is scoring better in this subject area than 60% of the 17-year-old hearing impaired students in the 1990 norming project.

Percentile scores are arrived at

a. by obtaining the proper subtest **scaled score** for the level of the test taken by the student (see 1-A above), and then,

b. by using the percentile norms table for the age of the hearing impaired student at testing, finding the percentile rank that corresponds to the scaled score.

An example: A 9-year-old hearing impaired student has answered 35 items correctly on the Primary 1 Reading Comprehension subtest:

1. using the Primary 1 score conversion table, you learn that a raw score of 35 in Reading Comprehension converts to a scaled score of 567 (page 4 of this booklet); then,
2. using the percentile rank tables for 9-year-olds, you are able to convert the 567 scaled score in Reading Comprehension to a percentile rank of 69 (page 30 of this booklet).

Please note that there are age-based percentile ranks based on all students in the norming sample (pp. 28 to 51) and also percentile ranks based only on students with severe - profound hearing losses in the norming sample (pp. 54 to 77).

SPECIAL NOTE:

At the upper six levels of the Stanford -- Primary 3 through Advanced 2 -- the *Language* subtest in the tables is a combination of the *Language Mechanics* and *Language Expression* scores.

Raw Scores to
Scaled Scores
and
Grade Equivalents

PRIMARY												
Raw Score	Word Study Skills		Word Reading		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54												
53												
52												
51												
50												
49												
48												
47												
46												
45												
44												
43												
42												
41												
40					654	7.1						
39					631	5.1						
38					605	3.6						
37					586	2.9						
36	658	6.4			577	2.7						
35	633	4.6			567	2.5						
34	606	3.5			559	2.3	653	6.5				
33	589	3.0			552	2.2	629	5.2				
32	576	2.7			546	2.1	603	4.2				
31	566	2.5			540	2.0	586	3.5				
30	556	2.3	625	4.7	534	2.0	574	3.2			639	5.5
29	548	2.2	601	3.4	529	1.9	564	2.8			615	4.5
28	541	2.0	575	2.7	524	1.9	555	2.6			588	3.6
27	534	1.8	559	2.4	520	1.8	547	2.5			572	3.1
26	527	1.7	547	2.1	515	1.8	540	2.3	630	5.1	560	2.7
25	521	1.7	537	2.0	511	1.7	534	2.2	607	4.3	550	2.5
24	515	1.6	528	1.9	506	1.7	528	2.1	580	3.5	541	2.4
23	509	1.5	521	1.8	502	1.7	522	1.9	564	3.0	533	2.2
22	504	1.5	514	1.7	498	1.6	516	1.7	552	2.7	526	2.1
21	499	1.4	507	1.6	494	1.6	511	1.7	542	2.5	519	1.9
20	493	1.4	501	1.6	490	1.6	506	1.6	533	2.3	513	1.8
19	488	1.3	495	1.5	485	1.5	500	1.5	525	2.2	507	1.7
18	483	1.3	490	1.5	481	1.5	495	1.4	518	2.0	501	1.6
17	478	1.2	484	1.4	477	1.5	490	1.4	511	1.8	495	1.5
16	473	1.2	479	1.4	473	1.4	485	1.3	505	1.7	489	1.4
15	468	1.1	474	1.4	468	1.4	479	1.2	499	1.6	484	1.4
14	462	1.0	468	1.3	464	1.4	474	1.2	492	1.5	478	1.3
13	457	1.0	463	1.3	459	1.3	469	1.1	486	1.4	472	1.2
12	452	K.9	457	1.2	455	1.3	463	K.9	480	1.4	466	1.1
11	446	K.8	452	1.1	450	1.2	457	K.8	474	1.3	460	1.0
10	441	K.7	446	1.1	444	1.2	451	K.7	467	1.2	454	K.8
9	434	K.6	439	1.0	439	1.1	444	K.5	461	1.1	447	K.7
8	428	K.6	433	K.9	433	1.0	437	K.4	454	K.9	440	K.5
7	421	K.5	426	K.8	426	K.8	429	K.3	446	K.7	432	K.4
6	414	K.4	418	K.7	419	K.7	421	K.2	438	K.6	424	K.3
5	405	K.2	409	K.6	411	K.6	411	K.0	429	K.4	415	K.1
4	395	K.1	399	K.4	401	K.5	400	PK	419	K.3	404	K.0
3	383	K.0	386	K.3	389	K.3	387	PK	406	K.1	390	PK
2	367	PK	369	K.1	373	K.1	369	PK	389	PK	373	PK
1	341	PK	343	PK	347	PK	341	PK	363	PK	345	PK

PRIMARY 1 (con't)

Raw Score	Spelling		Language		Environment				
	SS	GE	SS	GE	SS	GE			
60									
59									
58									
57									
56									
55									
54									
53									
52									
51									
50									
49									
48									
47									
46									
45									
44			676	10.1					
43			653	6.7					
42			627	4.7					
41			611	3.8					
40			599	3.4	694	PHS			
39			590	3.1	671	11.1			
38			582	2.8	645	7.4			
37			574	2.6	629	5.8			
36			568	2.5	617	5.1			
35			562	2.4	607	4.5			
34			557	2.3	599	3.9			
33			552	2.2	592	3.6			
32			547	2.1	585	3.4			
31			543	1.9	579	3.2			
30	639	5.5	539	1.8	574	2.9			
29	616	4.2	534	1.8	568	2.6			
28	590	3.0	530	1.7	563	2.3			
27	574	2.6	526	1.7	559	2.1			
26	562	2.3	523	1.7	554	1.7			
25	552	2.1	519	1.6	550	1.5			
24	543	2.0	515	1.6	545	1.3			
23	536	1.9	512	1.6	541	1.1			
22	529	1.8	508	1.5	537	1.0			
21	523	1.8	504	1.5	532	K.8			
20	517	1.7	501	1.5	528	K.7			
19	511	1.6	497	1.4	524	K.6			
18	506	1.6	493	1.4	520	K.5			
17	500	1.5	490	1.4	515	K.4			
16	495	1.5	486	1.4	511	K.2			
15	489	1.4	482	1.3	507	K.1			
14	484	1.4	478	1.3	502	K.0			
13	479	1.3	474	1.3	498	PK			
12	473	1.3	470	1.2	493	PK			
11	468	1.2	465	1.2	488	PK			
10	462	1.2	461	1.2	483	PK			
9	455	1.1	456	1.1	477	PK			
8	449	1.0	450	K.9	471	PK			
7	442	K.9	444	K.8	465	PK			
6	434	K.8	438	K.7	457	PK			
5	425	K.6	430	K.6	449	PK			
4	415	K.5	421	K.4	440	PK			
3	403	K.3	410	K.3	428	PK			
2	386	K.1	395	K.1	412	PK			
1	360	PK	369	PK	386	PK			

PRIMARY 2												
Raw Score	Word Study Skills		Reading Vocabulary		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54												
53												
52												
51												
50												
49												
48	714	PHS										
47	691	10.1										
46	665	7.1										
45	649	5.6										
44	637	4.8										
43	627	4.4										
42	619	4.1										
41	612	3.7										
40	605	3.5	716	PHS	728	PHS						
39	599	3.3	692	10.0	705	PHS						
38	594	3.2	666	7.4	679	10.1						
37	588	2.9	650	5.9	663	7.9						
36	583	2.8	638	5.4	651	6.6			703	11.2		
35	578	2.7	629	5.0	642	5.6			678	8.3	704	12.0
34	574	2.6	620	4.4	634	5.2	687	8.8	651	6.4	679	8.3
33	569	2.5	613	4.0	627	4.8	664	7.3	635	5.3	651	6.2
32	565	2.5	607	3.7	621	4.5	638	5.6	622	4.7	634	5.4
31	560	2.4	601	3.4	615	4.3	621	4.7	612	4.4	621	4.7
30	556	2.3	595	3.2	609	3.8	609	4.4	603	4.2	611	4.4
29	552	2.3	590	3.0	604	3.6	600	4.1	595	3.8	601	4.1
28	548	2.2	585	2.9	599	3.3	591	3.7	587	3.6	593	3.8
27	543	2.1	581	2.8	595	3.1	584	3.5	581	3.5	586	3.5
26	539	1.9	576	2.7	590	3.0	577	3.3	574	3.3	579	3.3
25	535	1.8	572	2.6	586	2.9	571	3.1	568	3.2	573	3.1
24	531	1.8	567	2.5	582	2.8	565	2.9	563	2.9	567	2.9
23	526	1.7	563	2.4	578	2.7	560	2.7	557	2.7	561	2.7
22	522	1.7	559	2.4	574	2.6	554	2.6	552	2.7	555	2.6
21	518	1.6	555	2.3	569	2.5	549	2.5	547	2.6	550	2.5
20	513	1.6	551	2.2	565	2.4	544	2.4	542	2.5	544	2.4
19	509	1.5	546	2.1	562	2.4	539	2.3	537	2.4	539	2.3
18	504	1.5	542	2.0	557	2.3	534	2.2	532	2.3	534	2.3
17	500	1.5	538	2.0	553	2.2	529	2.1	527	2.2	528	2.2
16	495	1.4	534	1.9	549	2.1	525	2.0	522	2.1	523	2.0
15	490	1.4	529	1.9	545	2.1	520	1.8	517	1.9	518	1.9
14	485	1.3	525	1.8	541	2.0	515	1.7	512	1.8	513	1.8
13	479	1.3	520	1.8	537	2.0	509	1.6	506	1.7	507	1.7
12	474	1.2	515	1.7	532	2.0	504	1.6	501	1.6	501	1.6
11	468	1.1	511	1.7	527	1.9	499	1.5	496	1.6	496	1.5
10	461	1.0	505	1.6	522	1.9	493	1.4	490	1.5	490	1.4
9	455	K.9	500	1.6	517	1.8	487	1.3	484	1.4	483	1.3
8	447	K.8	494	1.5	511	1.7	480	1.2	478	1.3	477	1.3
7	439	K.7	487	1.5	505	1.7	473	1.2	471	1.2	470	1.2
6	431	K.6	480	1.4	498	1.6	466	1.0	463	1.1	462	1.0
5	421	K.5	472	1.3	490	1.6	457	K.8	455	K.9	453	K.8
4	410	K.3	462	1.2	481	1.5	447	K.6	445	K.7	442	K.6
3	396	K.1	451	1.1	470	1.4	434	K.4	432	K.5	430	K.4
2	379	PK	435	K.9	454	1.3	418	K.1	416	K.2	413	K.1
1	351	PK	409	K.6	428	K.9	391	PK	390	PK	385	PK

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PRIMARY 2 (con't)									
Raw Score	Spelling		Language		Environment				
	SS	GE	SS	GE	SS	GE			
60									
59									
58									
57									
56									
55									
54									
53									
52									
51									
50									
49									
48									
47									
46									
45									
44			703	PHS					
43			680	11.5					
42			654	6.8					
41			639	5.5					
40			628	4.7	709	PHS			
39			619	4.3	685	PHS			
38			611	3.8	659	8.9			
37			604	3.5	644	7.3			
36			598	3.3	632	6.1			
35			593	3.2	622	5.4			
34			588	3.0	614	4.9			
33			583	2.8	607	4.5			
32			579	2.7	600	4.0			
31			574	2.6	594	3.7			
30	698	11.8	570	2.5	588	3.5			
29	674	8.3	566	2.5	583	3.3			
28	648	5.9	562	2.4	578	3.1			
27	632	5.1	559	2.3	573	2.9			
26	621	4.4	555	2.2	568	2.6			
25	611	4.0	551	2.2	564	2.3			
24	603	3.6	548	2.1	559	2.1			
23	596	3.2	544	2.0	555	1.8			
22	589	3.0	541	1.9	551	1.6			
21	583	2.8	537	1.8	546	1.4			
20	577	2.7	534	1.8	542	1.2			
19	571	2.5	530	1.7	538	1.0			
18	566	2.4	526	1.7	534	K.9			
17	561	2.3	523	1.7	529	K.7			
16	556	2.2	519	1.6	525	K.6			
15	551	2.1	515	1.6	520	K.5			
14	546	2.0	511	1.6	516	K.4			
13	540	1.9	507	1.5	511	K.2			
12	535	1.9	502	1.5	506	K.1			
11	530	1.8	496	1.5	501	K.0			
10	524	1.8	493	1.4	496	PK			
9	518	1.7	488	1.4	490	PK			
8	512	1.7	482	1.3	484	PK			
7	505	1.6	476	1.3	477	PK			
6	498	1.5	469	1.2	470	PK			
5	490	1.4	461	1.2	462	PK			
4	480	1.3	452	1.0	452	PK			
3	468	1.2	441	K.7	440	PK			
2	452	1.1	425	K.5	424	PK			
1	426	K.6	400	K.2	398	PK			

PRIMARY 3

Raw Score	Word Study Skills		Reading Vocabulary		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54					761	PHS						
53					738	PHS						
52					713	PHS						
51					698	PHS						
50					687	12.4						
49					678	9.9						
48	735	PHS			670	8.7						
47	712	PHS			664	8.1						
46	686	9.4			658	7.4						
45	671	7.8			653	6.8						
44	659	6.5			648	6.1			741	PHS		
43	650	5.6			644	5.7			718	PHS		
42	642	5.0			639	5.5			692	9.5		
41	636	4.7			635	5.3			677	8.2		
40	629	4.5	746	PHS	631	5.1			665	7.3		
39	624	4.3	722	PHS	628	4.9			656	6.6		
38	619	4.1	696	11.0	624	4.7			648	6.1	738	PHS
37	614	3.8	680	8.5	621	4.5			641	5.5	715	PHS
36	609	3.6	668	7.5	617	4.4			635	5.3	689	9.4
35	605	3.5	658	6.8	614	4.2			629	5.0	674	7.9
34	600	3.3	650	5.9	611	4.0	733	PHS	624	4.7	662	6.9
33	596	3.2	642	5.5	608	3.8	710	PHS	619	4.6	653	6.4
32	592	3.1	636	5.3	605	3.6	683	8.5	614	4.5	645	5.7
31	588	2.9	630	5.0	602	3.5	667	7.5	610	4.4	638	5.5
30	584	2.8	624	4.7	599	3.3	655	6.6	606	4.3	632	5.4
29	581	2.8	619	4.4	596	3.2	645	6.1	601	4.2	626	5.2
28	577	2.7	614	4.1	593	3.0	637	5.6	597	3.9	621	4.7
27	573	2.6	609	3.8	590	3.0	629	5.2	593	3.8	616	4.6
26	569	2.5	604	3.6	587	2.9	622	4.8	590	3.7	611	4.4
25	566	2.5	600	3.4	584	2.8	616	4.6	586	3.6	607	4.3
24	562	2.4	595	3.2	581	2.7	610	4.4	582	3.5	602	4.1
23	558	2.4	591	3.1	577	2.7	604	4.2	578	3.4	598	4.0
22	554	2.3	587	3.0	574	2.6	599	4.0	574	3.3	594	3.8
21	550	2.2	583	2.9	571	2.6	594	3.8	571	3.3	590	3.7
20	547	2.2	579	2.8	568	2.5	589	3.6	567	3.2	586	3.5
19	542	2.0	574	2.7	565	2.4	584	3.5	563	2.9	581	3.4
18	538	1.9	570	2.6	562	2.4	579	3.3	559	2.8	577	3.3
17	534	1.8	566	2.5	558	2.3	574	3.2	555	2.7	573	3.1
16	530	1.8	562	2.4	555	2.3	569	3.0	552	2.7	569	3.0
15	525	1.7	557	2.3	551	2.2	564	2.8	548	2.6	565	2.8
14	521	1.7	553	2.2	547	2.1	559	2.7	543	2.5	561	2.7
13	516	1.6	549	2.2	543	2.1	554	2.6	539	2.4	556	2.6
12	511	1.6	544	2.1	539	2.0	548	2.5	535	2.4	552	2.6
11	505	1.5	539	2.0	535	2.0	543	2.4	530	2.3	547	2.5
10	499	1.4	534	1.9	530	1.9	537	2.3	525	2.2	542	2.4
9	493	1.4	528	1.9	525	1.9	531	2.1	520	2.0	537	2.3
8	486	1.3	523	1.8	520	1.8	525	2.0	514	1.9	531	2.2
7	479	1.3	516	1.7	514	1.8	518	1.8	508	1.7	525	2.1
6	471	1.2	509	1.7	507	1.7	511	1.7	501	1.6	518	1.9
5	462	1.0	501	1.6	500	1.7	502	1.5	493	1.5	510	1.7
4	451	K.9	492	1.5	491	1.6	492	1.4	484	1.4	500	1.6
3	438	K.7	480	1.4	479	1.5	480	1.2	473	1.3	489	1.4
2	420	K.4	464	1.3	464	1.4	464	K.9	457	1.0	473	1.2
1	393	K.1	438	K.9	438	1.1	437	K.4	431	K.5	447	K.7

PRIMARY 3 (con't)												
Raw Score	Spelling		Language		Language Mechanics		Language Expression		Study Skills		Science	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60			761	PHS								
59			738	PHS								
58			712	PHS								
57			697	PHS								
56			686	PHS								
55			677	10.5								
54			670	9.1								
53			663	8.4								
52			658	7.8								
51			652	6.6								
50			648	6.2							749	PHS
49			643	5.7							726	PHS
48			639	5.5							701	PHS
47			635	5.2							685	PHS
46			632	5.0							674	11.5
45			628	4.7							665	10.1
44			625	4.6							657	8.7
43			621	4.4							650	8.2
42			618	4.3							644	7.5
41			615	4.1							639	7.0
40			612	3.8							634	6.4
39			609	3.7							629	5.9
38			607	3.6							625	5.5
37			604	3.5							620	5.2
36	745	PHS	601	3.4							616	4.9
35	722	PHS	598	3.3							612	4.7
34	696	11.5	596	3.3							609	4.5
33	680	9.1	593	3.2							605	4.3
32	668	7.8	590	3.1							601	3.9
31	659	7.0	588	3.0							598	3.7
30	651	6.1	585	2.9	737	PHS	735	PHS	738	PHS	594	3.6
29	643	5.6	582	2.8	713	PHS	712	PHS	714	PHS	591	3.5
28	637	5.4	580	2.7	686	12.8	686	PHS	688	10.7	587	3.4
27	631	4.9	577	2.7	669	8.7	670	9.4	671	8.2	584	3.3
26	625	4.5	575	2.6	657	7.0	658	8.0	658	6.8	581	3.2
25	620	4.4	572	2.6	647	5.8	649	6.4	648	5.8	577	3.0
24	615	4.2	569	2.5	638	5.3	640	5.6	639	5.5	574	2.8
23	610	3.9	566	2.5	630	4.7	633	5.1	632	4.9	570	2.6
22	605	3.7	564	2.4	623	4.4	626	4.6	624	4.4	567	2.4
21	600	3.4	561	2.4	616	4.1	620	4.4	618	4.1	564	2.2
20	596	3.2	558	2.3	610	3.8	614	3.8	612	3.6	560	2.0
19	591	3.0	555	2.2	604	3.6	609	3.6	606	3.3	557	1.8
18	587	2.9	552	2.2	599	3.4	603	3.4	600	3.1	553	1.6
17	582	2.8	549	2.1	593	3.3	598	3.3	595	2.9	549	1.4
16	578	2.7	546	2.0	588	3.1	593	3.1	589	2.8	545	1.2
15	573	2.6	542	1.9	583	2.9	587	2.9	584	2.7	541	1.1
14	568	2.5	539	1.8	577	2.7	582	2.7	578	2.6	537	K.9
13	564	2.4	535	1.8	572	2.6	577	2.6	573	2.5	533	K.8
12	559	2.2	531	1.7	567	2.5	571	2.5	568	2.4	528	K.7
11	554	2.1	527	1.7	561	2.4	566	2.4	562	2.3	524	K.5
10	548	2.0	523	1.7	556	2.3	560	2.3	557	2.2	519	K.4
9	543	2.0	518	1.6	550	2.2	554	2.2	551	2.1	513	K.2
8	536	1.9	513	1.6	543	2.0	548	2.0	544	2.0	507	K.1
7	530	1.8	507	1.5	537	1.8	541	1.8	538	2.0	501	PK
6	523	1.8	501	1.5	529	1.7	533	1.7	530	1.9	494	PK
5	515	1.7	494	1.4	521	1.7	525	1.7	522	1.8	485	PK
4	505	1.6	485	1.3	511	1.6	515	1.6	512	1.7	476	PK
3	493	1.5	474	1.3	500	1.5	503	1.5	500	1.6	464	PK
2	477	1.3	459	1.1	484	1.4	486	1.3	484	1.5	447	PK
1	451	1.0	434	K.6	458	1.1	460	1.1	458	1.3	421	PK

BEST COPY AVAILABLE

PRIMARY 3 (con't)

Raw Score	Social Science						
	SS	GE					
60							
59							
58							
57							
56							
55							
54							
53							
52							
51							
50	749	PHS					
49	726	PHS					
48	701	PHS					
47	686	PHS					
46	674	11.1					
45	666	9.1					
44	658	8.5					
43	651	7.7					
42	646	7.1					
41	640	6.6					
40	635	6.2					
39	631	5.8					
38	626	5.5					
37	622	5.3					
36	618	5.1					
35	615	4.9					
34	611	4.7					
33	607	4.5					
32	604	4.4					
31	600	4.2					
30	597	4.1					
29	594	3.9					
28	591	3.7					
27	587	3.6					
26	584	3.5					
25	581	3.4					
24	578	3.3					
23	574	3.1					
22	571	3.0					
21	568	2.8					
20	565	2.6					
19	561	2.4					
18	558	2.2					
17	554	2.0					
16	551	1.8					
15	547	1.6					
14	543	1.4					
13	539	1.2					
12	535	1.1					
11	530	K.9					
10	526	K.8					
9	521	K.6					
8	515	K.5					
7	509	K.3					
6	503	K.1					
5	495	PK					
4	486	PK					
3	475	PK					
2	459	PK					
1	434	PK					

Continue...

INTERMEDIATE 1

Raw Score	Reading Vocabulary		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications		Spelling	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54			771	PHS								
53			748	PHS								
52			722	PHS								
51			707	PHS								
50			696	PHS								
49			687	12.4								
48			679	10.1								
47			673	9.0								
46			667	8.4								
45			662	7.8								
44			657	7.3			766	PHS				
43			652	6.7			743	PHS				
42			648	6.1			717	PHS				
41			644	5.7			701	10.8				
40	761	PHS	640	5.5			689	9.0	756	PHS	768	PHS
39	738	PHS	636	5.3			680	8.4	733	PHS	745	PHS
38	712	PHS	633	5.2			672	7.9	708	PHS	719	PHS
37	696	11.0	629	5.0			665	7.3	692	9.7	703	PHS
36	685	9.1	626	4.8			659	6.8	681	8.5	692	10.8
35	676	8.2	623	4.6			653	6.5	672	7.7	683	9.6
34	668	7.5	620	4.5	760	PHS	648	6.1	664	7.2	675	8.4
33	661	7.2	617	4.4	736	PHS	643	5.6	657	6.6	668	7.8
32	655	6.3	614	4.2	710	PHS	638	5.4	651	6.2	662	7.3
31	649	5.8	611	4.0	694	10.0	634	5.3	645	5.7	656	6.6
30	644	5.6	608	3.8	682	8.5	629	5.0	640	5.6	651	6.1
29	639	5.4	605	3.6	673	7.9	625	4.8	635	5.4	646	5.8
28	634	5.2	602	3.5	665	7.4	621	4.6	631	5.3	641	5.6
27	630	5.0	599	3.3	657	6.7	617	4.5	626	5.2	636	5.4
26	625	4.7	596	3.2	651	6.4	613	4.4	622	4.8	632	5.1
25	621	4.5	593	3.0	645	6.1	609	4.4	618	4.6	628	4.7
24	617	4.3	590	3.0	639	5.7	605	4.3	614	4.5	623	4.5
23	613	4.0	587	2.9	634	5.4	602	4.2	610	4.4	619	4.3
22	609	3.8	584	2.8	628	5.1	598	4.0	606	4.3	615	4.2
21	605	3.6	581	2.7	623	4.8	594	3.8	602	4.1	611	4.0
20	601	3.4	578	2.7	618	4.6	590	3.7	599	4.0	607	3.8
19	598	3.3	575	2.6	614	4.5	587	3.6	595	3.8	603	3.6
18	594	3.2	571	2.6	609	4.4	583	3.5	591	3.7	599	3.4
17	590	3.0	568	2.5	604	4.2	579	3.5	587	3.6	595	3.2
16	586	2.9	565	2.4	600	4.1	575	3.4	583	3.4	591	3.0
15	582	2.8	561	2.4	595	3.8	571	3.3	579	3.3	587	2.9
14	578	2.8	557	2.3	590	3.6	567	3.2	575	3.2	583	2.8
13	573	2.7	554	2.2	585	3.5	562	2.9	571	3.1	578	2.7
12	569	2.6	550	2.2	580	3.3	558	2.8	566	2.8	574	2.6
11	564	2.5	545	2.1	575	3.2	553	2.7	562	2.7	569	2.5
10	560	2.4	541	2.0	569	3.0	548	2.6	557	2.6	564	2.4
9	554	2.3	536	2.0	564	2.8	543	2.5	552	2.6	558	2.2
8	549	2.2	531	1.9	558	2.7	537	2.4	546	2.5	553	2.1
7	543	2.1	525	1.9	551	2.6	531	2.3	540	2.4	546	2.0
6	536	2.0	518	1.8	544	2.4	524	2.1	533	2.2	539	1.9
5	528	1.9	511	1.7	535	2.2	516	1.9	526	2.1	531	1.8
4	519	1.8	502	1.7	526	2.0	507	1.7	516	1.8	522	1.8
3	508	1.7	491	1.6	514	1.7	496	1.6	505	1.6	510	1.6
2	492	1.5	475	1.4	498	1.5	480	1.4	490	1.4	495	1.5
1	467	1.3	450	1.2	472	1.1	455	K.9	464	1.0	469	1.2

INTERMEDIATE 1 (con't)														
Raw Score	Language		Language Mechanics		Language Expression		Study Skills		Science		Social Science	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60	771	PHS										
59	748	PHS										
58	723	PHS										
57	708	PHS										
56	696	PHS										
55	688	PHS										
54	680	11.5										
53	674	9.7										
52	668	8.9										
51	663	8.4										
50	658	7.8							772	PHS	765	PHS
49	654	6.8							750	PHS	742	PHS
48	649	6.3							724	PHS	717	PHS
47	645	5.8							709	PHS	702	PHS
46	642	5.7							698	PHS	691	PHS
45	638	5.4							689	PHS	682	12.6
44	635	5.2							681	12.8	674	11.1
43	632	5.0							675	11.6	668	9.5
42	628	4.7							669	10.7	662	8.7
41	625	4.6							664	9.8	656	8.4
40	622	4.5							659	8.8	652	7.8
39	619	4.3							654	8.5	647	7.3
38	616	4.2							650	8.2	643	6.8
37	614	4.0							646	7.7	639	6.5
36	611	3.8							642	7.3	635	6.2
35	608	3.6							638	6.8	631	5.8
34	605	3.5							634	6.4	627	5.6
33	603	3.5							631	6.2	624	5.4
32	600	3.4							627	5.7	620	5.2
31	597	3.3							624	5.5	617	5.0
30	595	3.3	743	PHS	750	PHS	750	PHS	620	5.2	614	4.9
29	592	3.2	719	PHS	726	PHS	727	PHS	617	5.0	611	4.7
28	589	3.0	692	PHS	700	PHS	701	PHS	614	4.8	607	4.5
27	587	3.0	676	9.6	684	PHS	685	9.8	611	4.6	604	4.4
26	584	2.9	663	8.1	672	9.7	673	8.4	607	4.4	601	4.3
25	581	2.8	653	6.5	662	8.5	663	7.5	604	4.2	598	4.1
24	578	2.7	644	5.6	654	7.3	655	6.5	601	3.9	595	4.0
23	576	2.7	636	5.2	647	6.2	647	5.8	598	3.7	591	3.7
22	573	2.6	629	4.7	640	5.6	640	5.5	594	3.6	588	3.6
21	570	2.5	622	4.4	634	5.2	634	5.2	591	3.5	585	3.5
20	567	2.5	616	4.1	628	4.7	628	4.6	588	3.4	582	3.4
19	564	2.4	610	3.8	622	4.5	623	4.4	584	3.3	578	3.3
18	561	2.4	604	3.6	617	4.2	617	3.9	581	3.2	575	3.2
17	558	2.3	599	3.4	611	3.7	612	3.6	577	3.0	571	3.0
16	555	2.2	593	3.3	606	3.5	606	3.3	573	2.7	568	2.8
15	551	2.2	588	3.1	601	3.4	601	3.1	569	2.5	564	2.6
14	548	2.1	582	2.9	596	3.2	596	3.0	565	2.3	560	2.3
13	544	2.0	577	2.7	591	3.0	591	2.8	561	2.0	556	2.1
12	540	1.9	571	2.6	585	2.8	585	2.7	557	1.8	552	1.8
11	536	1.8	566	2.5	580	2.7	580	2.6	552	1.5	548	1.6
10	532	1.7	560	2.4	574	2.6	574	2.5	547	1.3	543	1.4
9	527	1.7	554	2.3	568	2.5	568	2.4	542	1.1	538	1.2
8	522	1.7	547	2.1	562	2.3	562	2.3	536	K.9	533	1.0
7	516	1.6	540	1.9	555	2.2	555	2.1	529	K.7	527	K.8
6	510	1.6	533	1.8	548	2.0	548	2.1	522	K.5	520	K.6
5	502	1.5	524	1.7	540	1.8	539	2.0	514	K.3	512	K.4
4	493	1.4	514	1.6	530	1.7	529	1.9	504	K.0	503	K.1
3	482	1.3	502	1.5	518	1.6	517	1.7	492	PK	492	PK
2	467	1.2	486	1.4	502	1.5	501	1.6	476	PK	476	PK
1	442	K.7	460	1.2	476	1.3	475	1.4	450	PK	450	PK

BEST COPY AVAILABLE

INTERMEDIATE 2

Raw Score	Reading Vocabulary		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications		Spelling	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54			786	PHS								
53			763	PHS								
52			738	PHS								
51			723	PHS								
50			712	PHS							801	PHS
49			703	PHS							778	PHS
48			696	PHS							752	PHS
47			690	PHS							737	PHS
46			684	11.4							725	PHS
45			679	10.1							716	PHS
44			674	9.2			781	PHS			709	PHS
43			670	8.7			758	PHS			702	PHS
42			665	8.2			732	PHS			696	11.5
41			661	7.7			716	PHS			690	10.6
40	768	PHS	658	7.4			705	12.0	786	PHS	685	10.1
39	745	PHS	654	7.1			696	10.1	762	PHS	680	9.1
38	720	PHS	651	6.6			688	8.8	737	PHS	676	8.6
37	704	12.3	647	5.9			681	8.4	721	PHS	672	8.1
36	692	10.0	644	5.7			675	8.1	710	PHS	668	7.8
35	683	8.8	641	5.6			669	7.6	700	10.8	664	7.4
34	675	8.1	638	5.4	789	PHS	664	7.2	693	9.8	660	7.1
33	669	7.6	635	5.3	766	PHS	660	6.8	686	9.1	656	6.6
32	662	7.2	632	5.1	740	PHS	655	6.6	679	8.3	653	6.2
31	657	6.6	629	5.0	724	PHS	651	6.4	674	7.9	649	5.9
30	652	6.0	626	4.8	713	PHS	646	5.9	668	7.5	646	5.8
29	647	5.7	623	4.6	703	11.8	642	5.6	664	7.2	642	5.6
28	642	5.5	620	4.5	695	10.1	639	5.5	659	6.7	639	5.5
27	638	5.4	617	4.4	688	8.9	635	5.3	654	6.4	636	5.4
26	633	5.2	614	4.2	682	8.5	631	5.1	650	6.1	632	5.1
25	629	5.0	611	4.0	676	8.1	627	4.9	646	5.8	629	4.7
24	625	4.7	608	3.8	670	7.7	624	4.7	641	5.6	626	4.6
23	621	4.5	605	3.6	665	7.4	620	4.6	637	5.5	622	4.4
22	617	4.3	602	3.5	660	6.9	617	4.5	633	5.4	619	4.3
21	614	4.1	599	3.3	655	6.6	613	4.4	629	5.3	616	4.2
20	610	3.9	596	3.2	651	6.4	609	4.4	625	5.1	612	4.0
19	606	3.7	593	3.0	646	6.2	606	4.3	621	4.7	609	3.9
18	602	3.5	589	2.9	642	5.9	602	4.2	618	4.6	605	3.7
17	598	3.3	586	2.9	637	5.6	599	4.1	613	4.5	602	3.5
16	594	3.2	583	2.8	633	5.4	595	3.8	609	4.4	598	3.3
15	590	3.0	579	2.7	628	5.1	591	3.7	605	4.2	594	3.1
14	586	2.9	575	2.6	623	4.8	587	3.6	601	4.1	590	3.0
13	582	2.8	571	2.6	619	4.7	583	3.5	597	3.9	586	2.9
12	578	2.8	567	2.5	614	4.5	579	3.5	592	3.7	582	2.8
11	573	2.7	563	2.4	609	4.4	574	3.3	587	3.6	577	2.7
10	568	2.6	559	2.3	603	4.2	569	3.2	582	3.4	573	2.6
9	563	2.4	554	2.2	598	4.0	564	3.0	577	3.3	568	2.5
8	558	2.3	548	2.1	592	3.7	559	2.8	571	3.1	562	2.3
7	551	2.2	542	2.1	585	3.5	553	2.7	565	2.8	556	2.2
6	545	2.1	536	2.0	578	3.3	546	2.6	558	2.7	549	2.0
5	537	2.0	528	1.9	570	3.0	538	2.4	550	2.5	542	2.0
4	528	1.9	519	1.8	561	2.8	529	2.2	541	2.4	532	1.9
3	516	1.7	508	1.7	549	2.5	518	2.0	529	2.2	521	1.7
2	501	1.6	493	1.6	533	2.2	503	1.7	513	1.8	506	1.6
1	475	1.4	467	1.4	507	1.6	477	1.3	488	1.4	480	1.3

INTERMEDIATE 2 (con't)

Raw Score	Language		Language Mechanics		Language Expression		Study Skills		Science		Social Science	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60	791	PHS										
59	768	PHS										
58	742	PHS										
57	727	PHS										
56	715	PHS										
55	706	PHS										
54	698	PHS										
53	692	PHS										
52	686	PHS										
51	681	11.8										
50	676	10.1							786	PHS	[illegible]37	PHS
49	671	9.2							763	PHS	764	PHS
48	667	8.8							737	PHS	739	PHS
47	663	8.4							722	PHS	724	PHS
46	659	7.9							710	PHS	713	PHS
45	655	7.1							701	PHS	704	PHS
44	651	6.5							693	PHS	696	PHS
43	648	6.2							686	PHS	690	PHS
42	645	5.8							680	12.6	684	PHS
41	641	5.6							675	11.6	679	12.1
40	638	5.4							670	10.8	674	11.1
39	635	5.2							665	10.1	669	9.8
38	632	5.0							660	8.9	665	8.9
37	629	4.8							656	8.6	661	8.6
36	626	4.6							652	8.3	657	8.4
35	623	4.5							648	8.1	653	8.1
34	621	4.4							644	7.5	650	7.6
33	618	4.3							640	7.1	646	7.1
32	615	4.1							637	6.7	643	6.8
31	612	3.8							633	6.4	639	6.5
30	609	3.7	764	PHS	768	PHS	763	PHS	630	6.1	636	6.3
29	607	3.6	739	PHS	744	PHS	739	PHS	626	5.6	633	6.1
28	604	3.5	711	PHS	718	PHS	712	PHS	623	5.4	630	5.7
27	601	3.4	694	PHS	702	PHS	696	12.8	619	5.2	626	5.5
26	598	3.3	681	11.1	689	PHS	684	9.6	616	4.9	623	5.4
25	596	3.3	671	9.0	679	11.8	673	8.4	613	4.7	620	5.2
24	593	3.2	661	7.8	671	9.5	665	7.7	609	4.5	617	5.0
23	590	3.1	653	6.5	663	8.6	657	6.7	606	4.4	614	4.9
22	587	3.0	646	5.7	656	7.8	650	6.0	603	4.1	611	4.7
21	584	2.9	639	5.4	649	6.4	643	5.6	599	3.8	607	4.5
20	581	2.8	632	4.9	643	5.8	637	5.4	596	3.7	604	4.4
19	578	2.7	626	4.5	637	5.5	631	4.8	592	3.5	601	4.3
18	575	2.6	620	4.3	632	5.0	626	4.5	589	3.4	597	4.1
17	572	2.6	615	4.1	626	4.6	620	4.2	585	3.3	594	3.9
16	569	2.5	609	3.8	621	4.4	615	3.8	581	3.2	590	3.7
15	565	2.4	604	3.6	615	3.9	610	3.5	577	3.0	586	3.6
14	562	2.4	598	3.4	610	3.7	604	3.2	574	2.8	583	3.5
13	558	2.3	593	3.3	604	3.5	599	3.0	569	2.5	579	3.3
12	554	2.2	587	3.1	599	3.3	594	2.9	565	2.3	575	3.2
11	550	2.1	581	2.8	593	3.1	588	2.8	561	2.0	570	2.9
10	545	2.0	576	2.7	587	2.9	582	2.6	556	1.7	565	2.6
9	541	1.9	569	2.6	581	2.7	577	2.5	551	1.5	560	2.3
8	536	1.8	563	2.4	575	2.6	570	2.4	545	1.2	555	2.0
7	530	1.7	556	2.3	568	2.5	564	2.3	539	1.0	549	1.7
6	523	1.7	549	2.2	560	2.3	556	2.2	532	K.8	542	1.4
5	516	1.6	540	1.9	552	2.1	548	2.1	524	K.5	535	1.1
4	507	1.5	530	1.7	542	1.9	538	2.0	515	K.3	526	K.8
3	496	1.4	518	1.6	530	1.7	526	1.8	504	K.0	514	K.4
2	481	1.3	502	1.5	514	1.6	510	1.7	488	PK	499	K.0
1	456	1.1	476	1.3	488	1.4	484	1.5	463	PK	473	PK

INTERMEDIATE 3

Raw Score	Reading Vocabulary		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications		Spelling	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54			801	PHS								
53			778	PHS								
52			753	PHS								
51			738	PHS								
50			726	PHS							814	PHS
49			717	PHS							791	PHS
48			710	PHS							766	PHS
47			703	PHS							751	PHS
46			697	PHS							739	PHS
45			692	PHS							730	PHS
44			687	12.4			809	PHS			723	PHS
43			683	11.1			786	PHS			716	PHS
42			678	9.9			760	PHS			710	PHS
41			674	9.2			745	PHS			705	PHS
40	791	PHS	670	8.7			733	PHS	804	PHS	700	12.5
39	768	PHS	667	8.4			724	PHS	781	PHS	695	11.4
38	743	PHS	663	7.9			717	PHS	756	PHS	691	10.7
37	727	PHS	660	7.6			710	PHS	740	PHS	687	10.3
36	716	PHS	656	7.3			704	11.8	729	PHS	683	9.6
35	706	12.6	653	6.8			698	10.4	720	PHS	679	9.0
34	698	11.2	650	6.5	798	PHS	693	9.7	712	PHS	675	8.4
33	692	10.0	646	5.8	774	PHS	688	8.8	705	12.2	672	8.1
32	685	9.1	643	5.7	748	PHS	684	8.6	699	10.7	668	7.8
31	680	8.5	640	5.5	732	PHS	679	8.3	693	9.8	665	7.5
30	674	7.9	637	5.4	720	PHS	675	8.1	688	9.3	661	7.2
29	670	7.6	634	5.2	711	PHS	671	7.8	683	8.6	658	6.9
28	665	7.4	631	5.1	702	11.1	668	7.6	679	8.3	655	6.4
27	660	7.1	628	4.9	695	10.1	664	7.2	674	7.9	651	6.1
26	656	6.5	625	4.7	689	9.1	660	6.8	670	7.6	648	5.9
25	652	6.0	621	4.5	683	8.5	656	6.6	666	7.3	645	5.7
24	648	5.8	618	4.4	677	8.2	653	6.5	662	6.9	642	5.6
23	644	5.6	615	4.3	672	7.8	649	6.2	658	6.6	638	5.5
22	640	5.4	612	4.1	667	7.5	646	5.9	654	6.4	635	5.3
21	636	5.3	609	3.8	662	7.2	642	5.6	650	6.1	632	5.1
20	632	5.1	605	3.6	657	6.7	639	5.5	646	5.8	628	4.7
19	628	4.9	602	3.5	652	6.5	635	5.3	642	5.6	625	4.5
18	624	4.7	598	3.3	648	6.3	631	5.1	638	5.5	622	4.4
17	620	4.4	595	3.1	643	6.0	628	4.9	634	5.4	618	4.3
16	615	4.2	591	3.0	639	5.7	624	4.7	630	5.3	614	4.1
15	611	3.9	587	2.9	634	5.4	620	4.6	626	5.2	611	4.0
14	607	3.7	583	2.8	630	5.2	616	4.5	622	4.8	607	3.8
13	603	3.5	579	2.7	625	4.9	612	4.4	618	4.6	603	3.6
12	598	3.3	574	2.6	620	4.7	608	4.3	613	4.5	598	3.3
11	593	3.1	570	2.5	616	4.6	603	4.2	608	4.3	594	3.1
10	588	3.0	565	2.4	610	4.4	598	4.0	603	4.2	589	3.0
9	583	2.9	559	2.3	605	4.2	593	3.8	598	4.0	584	2.9
8	577	2.7	553	2.2	599	4.0	587	3.6	593	3.8	578	2.7
7	570	2.6	547	2.1	593	3.7	581	3.5	586	3.5	572	2.6
6	563	2.4	540	2.0	586	3.5	574	3.3	579	3.3	565	2.4
5	555	2.3	532	2.0	578	3.3	567	3.2	572	3.1	557	2.2
4	545	2.1	522	1.9	569	3.0	557	2.7	562	2.7	548	2.0
3	534	1.9	510	1.7	557	2.7	546	2.6	551	2.5	536	1.9
2	517	1.7	494	1.6	542	2.4	530	2.3	535	2.3	520	1.7
1	491	1.5	468	1.4	516	1.7	505	1.7	509	1.7	495	1.5

BEST COPY AVAILABLE

	INTERMEDIATE 3 (con't)											
Raw Score	Language		Language Mechanics		Language Expression		Study Skills		Science		Social Science	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60	813	PHS										
59	790	PHS										
58	763	PHS										
57	748	PHS										
56	736	PHS										
55	727	PHS										
54	719	PHS										
53	712	PHS										
52	706	PHS										
51	701	PHS										
50	696	PHS							795	PHS	791	PHS
49	691	PHS							772	PHS	768	PHS
48	687	PHS							747	PHS	743	PHS
47	683	12.5							732	PHS	728	PHS
46	679	11.1							720	PHS	717	PHS
45	675	9.8							711	PHS	708	PHS
44	671	9.2							704	PHS	700	PHS
43	668	8.9							697	PHS	694	PHS
42	665	8.6							691	PHS	688	PHS
41	662	8.3							686	PHS	683	12.8
40	658	7.8							681	12.8	678	11.8
39	655	7.1							676	11.8	673	10.8
38	652	6.6							672	11.2	669	9.8
37	649	6.3							668	10.5	665	8.9
36	647	6.1							664	9.8	661	8.6
35	644	5.8							660	8.9	658	8.5
34	641	5.6							656	8.6	654	8.2
33	638	5.4							653	8.4	651	7.7
32	635	5.2					781	PHS	649	8.2	647	7.3
31	633	5.1					757	PHS	646	7.7	644	6.9
30	630	4.8	789	PHS	788	PHS	731	PHS	643	7.4	641	6.7
29	627	4.7	763	PHS	764	PHS	715	PHS	639	7.0	637	6.4
28	624	4.5	734	PHS	738	PHS	703	PHS	636	6.6	634	6.2
27	621	4.4	716	PHS	721	PHS	693	11.8	633	6.4	631	5.8
26	619	4.3	702	PHS	709	PHS	685	9.8	630	6.1	628	5.6
25	616	4.2	691	PHS	699	PHS	677	8.7	626	5.6	625	5.5
24	613	3.9	682	11.5	691	PHS	671	8.2	623	5.4	622	5.3
23	610	3.7	674	9.4	683	PHS	664	7.6	620	5.2	618	5.1
22	607	3.6	666	8.5	676	10.8	658	6.8	617	5.0	615	4.9
21	604	3.5	659	7.3	669	9.2	653	6.3	613	4.7	612	4.8
20	601	3.4	653	6.5	663	8.6	647	5.8	610	4.6	609	4.6
19	598	3.3	647	5.8	657	7.9	642	5.6	606	4.4	605	4.5
18	595	3.3	641	5.5	652	6.8	637	5.4	603	4.1	602	4.3
17	592	3.2	635	5.2	646	6.1	632	4.9	599	3.8	599	4.2
16	589	3.0	630	4.7	641	5.7	627	4.6	596	3.7	595	4.0
15	585	2.9	624	4.4	635	5.3	622	4.3	592	3.5	591	3.7
14	582	2.8	619	4.3	630	4.8	617	3.9	588	3.4	588	3.6
13	578	2.7	613	3.9	625	4.6	611	3.6	584	3.3	584	3.5
12	574	2.6	608	3.7	619	4.3	606	3.3	579	3.1	579	3.3
11	570	2.5	602	3.5	613	3.8	601	3.1	575	2.9	575	3.2
10	565	2.4	596	3.3	607	3.6	595	2.9	570	2.6	570	2.9
9	561	2.4	590	3.2	601	3.4	589	2.8	565	2.3	565	2.6
8	555	2.2	583	2.9	595	3.2	583	2.7	559	1.9	560	2.3
7	550	2.1	576	2.7	588	2.9	576	2.5	553	1.6	554	2.0
6	543	1.9	569	2.6	580	2.7	569	2.4	545	1.2	547	1.6
5	536	1.8	560	2.4	571	2.5	561	2.2	537	K.9	539	1.2
4	527	1.7	550	2.2	561	2.3	551	2.1	528	K.7	530	K.9
3	516	1.6	538	1.9	549	2.1	539	2.0	516	K.3	519	K.6
2	501	1.5	522	1.7	533	1.7	523	1.8	500	PK	503	K.1
1	475	1.3	496	1.5	506	1.5	497	1.6	473	PK	478	PK

ADVANCED 1

Raw Score	Reading Vocabulary		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications		Spelling	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54			819	PHS								
53			796	PHS								
52			770	PHS								
51			754	PHS								
50			743	PHS							815	PHS
49			733	PHS							792	PHS
48			726	PHS							767	PHS
47			719	PHS							752	PHS
46			712	PHS							740	PHS
45			707	PHS							731	PHS
44			702	PHS			818	PHS			724	PHS
43			697	PHS			795	PHS			717	PHS
42			692	PHS			770	PHS			711	PHS
41			688	12.8			754	PHS			706	PHS
40	795	PHS	684	11.4			743	PHS	814	PHS	701	12.8
39	772	PHS	680	10.3			734	PHS	791	PHS	696	11.5
38	746	PHS	676	9.5			727	PHS	766	PHS	692	10.8
37	730	PHS	673	9.0			720	PHS	750	PHS	688	10.4
36	718	PHS	669	8.6			714	PHS	739	PHS	684	9.8
35	709	PHS	665	8.2			709	PHS	730	PHS	680	9.1
34	701	11.7	662	7.8	818	PHS	704	11.8	722	PHS	677	8.8
33	694	10.5	659	7.5	794	PHS	699	10.5	715	PHS	673	8.2
32	688	9.4	655	7.2	768	PHS	695	10.0	709	PHS	670	8.0
31	682	8.7	652	6.7	752	PHS	691	9.4	703	11.8	666	7.6
30	676	8.2	649	6.3	740	PHS	687	8.7	698	10.5	663	7.4
29	671	7.7	646	5.8	730	PHS	683	8.5	693	9.8	660	7.1
28	666	7.4	643	5.7	722	PHS	679	8.3	688	9.3	656	6.6
27	662	7.2	639	5.5	715	PHS	675	8.1	684	8.7	653	6.2
26	657	6.6	636	5.3	708	PHS	672	7.9	679	8.3	650	6.0
25	653	6.0	633	5.2	702	11.1	668	7.6	675	8.0	647	5.8
24	648	5.8	630	5.0	697	10.4	665	7.3	671	7.7	643	5.6
23	644	5.6	627	4.8	691	9.5	661	6.9	667	7.4	640	5.5
22	640	5.4	623	4.6	686	8.7	658	6.7	663	7.1	637	5.4
21	636	5.3	620	4.5	681	8.4	654	6.5	659	6.7	634	5.3
20	632	5.1	617	4.4	676	8.1	651	6.4	655	6.5	630	4.8
19	628	4.9	613	4.2	672	7.8	647	6.0	652	6.3	627	4.6
18	624	4.7	610	3.9	667	7.5	643	5.6	648	5.9	624	4.5
17	620	4.4	606	3.7	663	7.2	640	5.5	644	5.7	620	4.4
16	616	4.2	602	3.5	658	6.8	636	5.4	640	5.6	617	4.3
15	612	4.0	599	3.3	653	6.5	632	5.2	636	5.5	613	4.1
14	607	3.7	595	3.1	649	6.3	628	4.9	631	5.3	609	3.9
13	603	3.5	590	3.0	644	6.1	624	4.7	627	5.2	605	3.7
12	598	3.3	586	2.9	639	5.7	620	4.6	623	4.8	601	3.5
11	593	3.1	582	2.8	634	5.4	615	4.5	618	4.6	597	3.3
10	588	3.0	577	2.7	629	5.2	610	4.4	613	4.5	592	3.1
9	583	2.9	571	2.6	623	4.8	605	4.3	608	4.3	587	2.9
8	577	2.7	566	2.5	617	4.6	600	4.1	602	4.1	582	2.8
7	571	2.6	560	2.3	610	4.4	594	3.8	596	3.9	576	2.7
6	564	2.5	553	2.2	603	4.2	587	3.6	589	3.6	569	2.5
5	556	2.3	545	2.1	595	3.8	579	3.5	582	3.4	562	2.3
4	547	2.1	535	2.0	586	3.5	570	3.2	572	3.1	553	2.1
3	535	1.9	524	1.9	574	3.2	559	2.8	561	2.7	541	2.0
2	519	1.8	508	1.7	558	2.7	543	2.5	545	2.4	526	1.8
1	494	1.5	482	1.5	532	2.2	518	2.0	520	1.9	501	1.6

ADVANCED 1 (con't)

Raw Score	Language		Language Mechanics		Language Expression		Study Skills		Science		Social Science	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60	815	PHS										
59	792	PHS										
58	767	PHS										
57	752	PHS										
56	740	PHS										
55	731	PHS										
54	724	PHS										
53	717	PHS										
52	712	PHS										
51	706	PHS										
50	702	PHS							800	PHS	798	PHS
49	697	PHS							777	PHS	775	PHS
48	693	PHS							752	PHS	750	PHS
47	689	PHS							736	PHS	735	PHS
46	685	PHS							725	PHS	724	PHS
45	681	11.8							716	PHS	715	PHS
44	678	10.8							708	PHS	707	PHS
43	675	9.8							702	PHS	701	PHS
42	671	9.2							696	PHS	695	PHS
41	668	8.9							690	PHS	689	PHS
40	665	8.6							685	PHS	685	PHS
39	662	8.3							681	12.8	680	12.3
38	659	7.9							676	11.8	676	11.5
37	656	7.3							672	11.2	672	10.6
36	653	6.7							668	10.5	668	9.5
35	651	6.5							664	9.8	664	8.8
34	648	6.2							661	9.1	660	8.6
33	645	5.8							657	8.7	657	8.4
32	642	5.7					789	PHS	654	8.5	653	8.1
31	640	5.6					765	PHS	650	8.2	650	7.6
30	637	5.3	795	PHS	786	PHS	739	PHS	647	7.8	647	7.3
29	634	5.1	771	PHS	762	PHS	723	PHS	644	7.5	643	6.8
28	631	4.9	744	PHS	736	PHS	711	PHS	640	7.1	640	6.6
27	629	4.8	728	PHS	720	PHS	702	PHS	637	6.7	637	6.4
26	626	4.6	715	PHS	708	PHS	693	11.8	634	6.4	634	6.2
25	623	4.5	705	PHS	698	PHS	686	10.1	631	6.2	631	5.8
24	620	4.4	696	PHS	690	PHS	679	8.8	627	5.7	628	5.6
23	617	4.2	688	PHS	682	12.8	673	8.4	624	5.5	624	5.4
22	615	4.1	681	11.1	675	10.5	667	7.9	621	5.3	621	5.3
21	612	3.8	674	9.4	669	9.2	662	7.4	618	5.1	618	5.1
20	609	3.7	667	8.5	663	8.6	657	6.7	614	4.8	615	4.9
19	606	3.6	661	7.8	657	7.9	651	6.1	611	4.6	611	4.7
18	602	3.5	655	6.7	651	6.7	646	5.7	607	4.4	608	4.6
17	599	3.4	650	6.0	646	6.1	641	5.6	604	4.2	604	4.4
16	596	3.3	644	5.6	640	5.6	636	5.4	600	3.8	601	4.3
15	593	3.2	638	5.3	635	5.3	631	4.8	596	3.7	597	4.1
14	589	3.0	633	5.0	630	4.8	626	4.5	592	3.5	593	3.8
13	585	2.9	627	4.6	624	4.5	621	4.3	588	3.4	589	3.7
12	581	2.8	622	4.4	619	4.3	616	3.8	584	3.3	585	3.5
11	577	2.7	616	4.1	613	3.8	610	3.5	580	3.1	581	3.4
10	573	2.6	610	3.8	607	3.6	604	3.2	575	2.9	576	3.2
9	568	2.5	604	3.6	601	3.4	598	3.0	570	2.6	571	3.0
8	563	2.4	598	3.4	594	3.2	592	2.9	564	2.2	566	2.7
7	557	2.3	591	3.2	587	2.9	585	2.7	558	1.8	560	2.3
6	551	2.2	583	2.9	580	2.7	578	2.6	551	1.5	553	1.9
5	543	1.9	575	2.7	571	2.5	569	2.4	543	1.1	545	1.5
4	535	1.8	565	2.5	561	2.3	559	2.2	534	K.8	536	1.1
3	524	1.7	553	2.2	549	2.1	547	2.0	522	K.5	525	K.7
2	508	1.5	537	1.8	533	1.7	531	1.9	506	K.1	510	K.3
1	483	1.3	510	1.6	506	1.5	504	1.6	480	PK	484	PK

ADVANCED 2

Raw Score	Reading Vocabulary		Reading Comprehension		Concepts of Number		Mathematics Computation		Mathematics Applications		Spelling	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54			816	PHS								
53			793	PHS								
52			767	PHS								
51			752	PHS								
50			741	PHS							830	PHS
49			732	PHS							807	PHS
48			724	PHS							782	PHS
47			717	PHS							766	PHS
46			712	PHS							755	PHS
45			706	PHS							745	PHS
44			701	PHS			832	PHS			738	PHS
43			697	PHS			809	PHS			731	PHS
42			692	PHS			784	PHS			725	PHS
41			688	12.8			768	PHS			720	PHS
40	812	PHS	684	11.4			757	PHS	841	PHS	714	PHS
39	788	PHS	681	10.6			748	PHS	818	PHS	710	PHS
38	763	PHS	677	9.7			741	PHS	792	PHS	705	PHS
37	747	PHS	674	9.2			734	PHS	776	PHS	701	12.8
36	735	PHS	670	8.7			728	PHS	764	PHS	697	11.7
35	726	PHS	667	8.4			722	PHS	754	PHS	693	11.1
34	718	PHS	664	8.1	822	PHS	717	PHS	746	PHS	689	10.5
33	711	PHS	661	7.7	799	PHS	713	PHS	739	PHS	686	10.2
32	705	12.4	658	7.4	773	PHS	708	PHS	733	PHS	682	9.4
31	699	11.4	655	7.2	757	PHS	704	11.8	727	PHS	679	9.0
30	693	10.2	652	6.7	745	PHS	700	10.7	721	PHS	675	8.4
29	688	9.4	649	6.3	736	PHS	696	10.1	716	PHS	672	8.1
28	684	9.0	646	5.8	728	PHS	692	9.5	711	PHS	669	7.9
27	679	8.4	643	5.7	721	PHS	688	8.8	707	PHS	665	7.5
26	675	8.1	640	5.5	714	PHS	685	8.6	702	11.1	662	7.3
25	670	7.6	637	5.4	708	PHS	681	8.4	698	10.5	659	7.0
24	666	7.4	634	5.2	703	11.8	677	8.2	694	10.1	655	6.4
23	662	7.2	631	5.1	697	10.4	674	8.0	690	9.5	652	6.1
22	658	6.8	628	4.9	692	9.7	670	7.7	686	9.1	649	5.9
21	654	6.1	625	4.7	687	8.8	667	7.5	682	8.5	646	5.8
20	650	5.9	622	4.6	683	8.5	663	7.1	678	8.2	642	5.6
19	646	5.7	619	4.5	678	8.2	659	6.8	674	7.9	639	5.5
18	642	5.5	616	4.3	673	7.9	656	6.6	670	7.6	635	5.3
17	638	5.4	612	4.1	669	7.6	652	6.4	666	7.3	632	5.1
16	634	5.2	609	3.8	664	7.3	648	6.1	662	6.9	628	4.7
15	630	5.0	606	3.7	660	6.9	644	5.7	657	6.6	624	4.5
14	625	4.7	602	3.5	655	6.6	640	5.5	653	6.4	621	4.4
13	621	4.5	598	3.3	650	6.4	636	5.4	649	6.0	617	4.3
12	617	4.3	594	3.1	645	6.1	632	5.2	644	5.7	612	4.0
11	612	4.0	590	3.0	640	5.8	627	4.9	640	5.6	608	3.8
10	607	3.7	586	2.9	635	5.5	622	4.7	635	5.4	603	3.6
9	602	3.5	581	2.7	629	5.2	617	4.5	630	5.3	598	3.3
8	596	3.2	575	2.6	623	4.8	612	4.4	624	4.9	593	3.1
7	590	3.0	570	2.5	617	4.6	605	4.3	618	4.6	587	2.9
6	583	2.9	563	2.4	610	4.4	599	4.1	611	4.4	580	2.8
5	575	2.7	556	2.3	602	4.1	591	3.7	603	4.2	572	2.6
4	566	2.5	547	2.1	592	3.7	582	3.5	594	3.8	563	2.3
3	555	2.3	536	2.0	581	3.4	570	3.2	582	3.4	552	2.1
2	539	2.0	520	1.8	565	2.9	555	2.7	567	2.9	537	1.9
1	514	1.7	495	1.6	539	2.3	529	2.2	541	2.4	511	1.6

ADVANCED 2 (con't)													
Raw Score	Language		Language Mechanics		Language Expression		Study Skills		Science		Social Science	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60	826	PHS										
59	803	PHS										
58	777	PHS										
57	762	PHS										
56	750	PHS										
55	741	PHS										
54	734	PHS										
53	727	PHS										
52	721	PHS										
51	716	PHS										
50	711	PHS							812	PHS	809	PHS
49	706	PHS							790	PHS	786	PHS
48	702	PHS							764	PHS	761	PHS
47	696	PHS							749	PHS	746	PHS
46	694	PHS							738	PHS	735	PHS
45	690	PHS							729	PHS	726	PHS
44	687	PHS							722	PHS	718	PHS
43	683	12.5							715	PHS	712	PHS
42	680	11.5							709	PHS	706	PHS
41	677	10.5							704	PHS	701	PHS
40	673	9.5							699	PHS	696	PHS
39	670	9.1							695	PHS	691	PHS
38	667	8.8							691	PHS	687	PHS
37	665	8.6							687	PHS	683	12.8
36	662	8.3							683	PHS	679	12.1
35	659	7.9							679	12.5	676	11.5
34	656	7.3							676	11.8	672	10.6
33	653	6.7							672	11.2	669	9.8
32	650	6.4					807	PHS	669	10.7	665	8.9
31	648	6.2					783	PHS	666	10.2	662	8.7
30	645	5.8	808	PHS	795	PHS	756	PHS	662	9.3	659	8.5
29	642	5.7	783	PHS	771	PHS	739	PHS	659	8.8	656	8.4
28	639	5.5	756	PHS	744	PHS	727	PHS	656	8.6	652	7.8
27	637	5.3	740	PHS	728	PHS	716	PHS	653	8.4	649	7.5
26	634	5.1	727	PHS	715	PHS	708	PHS	650	8.2	646	7.1
25	631	4.9	716	PHS	705	PHS	700	PHS	647	7.8	643	6.8
24	628	4.7	707	PHS	696	PHS	693	11.8	644	7.5	640	6.6
23	626	4.6	699	PHS	688	PHS	686	10.1	641	7.2	637	6.4
22	623	4.5	692	PHS	681	12.5	680	8.9	637	6.7	634	6.2
21	620	4.4	685	12.5	674	10.1	674	8.5	634	6.4	630	5.7
20	617	4.2	679	10.3	668	9.1	668	8.0	631	6.2	627	5.6
19	614	4.0	673	9.2	662	8.5	663	7.5	628	5.8	624	5.4
18	611	3.8	667	8.5	656	7.8	657	6.7	624	5.5	620	5.2
17	608	3.6	661	7.8	651	6.7	652	6.2	621	5.3	617	5.0
16	604	3.5	656	6.8	645	6.0	647	5.8	618	5.1	613	4.8
15	601	3.4	650	6.0	640	5.6	641	5.6	614	4.8	610	4.7
14	597	3.3	645	5.7	634	5.2	636	5.4	610	4.6	606	4.5
13	594	3.2	639	5.4	629	4.8	631	4.8	606	4.4	602	4.3
12	590	3.1	633	5.0	624	4.5	625	4.5	602	4.0	598	4.1
11	586	2.9	628	4.6	618	4.3	620	4.2	598	3.7	593	3.8
10	581	2.8	622	4.4	612	3.7	614	3.7	593	3.6	588	3.6
9	577	2.7	615	4.1	606	3.5	608	3.4	588	3.4	583	3.5
8	571	2.6	609	3.8	600	3.3	602	3.1	583	3.2	577	3.2
7	566	2.5	602	3.5	593	3.1	595	2.9	577	3.0	571	3.0
6	559	2.3	594	3.3	585	2.8	587	2.7	570	2.6	564	2.6
5	552	2.2	586	3.0	577	2.6	579	2.6	562	2.1	556	2.1
4	543	1.9	576	2.7	567	2.4	569	2.4	553	1.6	546	1.5
3	532	1.7	563	2.4	555	2.2	557	2.2	541	1.1	534	1.0
2	517	1.6	547	2.1	539	1.8	541	2.0	526	K.6	518	K.5
1	492	1.4	521	1.7	513	1.6	514	1.7	500	PK	492	PK

LISTENING

Raw Score	Primary 1		Primary 2		Primary 3		Intermediate 1		Intermediate 2		Intermediate 3	
	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE	SS	GE
60												
59												
58												
57												
56												
55												
54												
53												
52												
51												
50												
49												
48												
47												
46												
45	705	PHS	723	PHS	752	PHS	775	PHS	775	PHS	787	PHS
44	682	12.1	700	PHS	729	PHS	751	PHS	752	PHS	764	PHS
43	657	8.0	674	10.6	704	PHS	725	PHS	727	PHS	737	PHS
42	641	6.3	659	8.2	688	PHS	709	PHS	711	PHS	721	PHS
41	630	5.4	647	7.1	677	11.2	697	PHS	700	PHS	709	PHS
40	620	4.6	638	5.9	668	9.3	688	PHS	690	PHS	700	PHS
39	613	4.1	630	5.4	660	8.3	680	11.7	682	12.1	692	PHS
38	606	3.7	624	4.9	653	7.7	672	10.3	676	11.0	684	12.5
37	600	3.4	618	4.5	647	7.1	666	8.9	669	9.5	678	11.4
36	594	3.1	612	4.0	641	6.3	660	8.3	664	8.7	672	10.3
35	589	2.9	607	3.8	636	5.7	654	7.8	659	8.2	666	8.9
34	584	2.6	602	3.5	631	5.4	649	7.3	654	7.8	661	8.4
33	580	2.5	597	3.3	626	5.1	644	6.7	649	7.3	656	7.9
32	575	2.2	593	3.1	622	4.8	640	6.1	645	6.8	652	7.6
31	571	2.1	589	2.9	618	4.5	635	5.6	640	6.1	647	7.1
30	567	1.9	585	2.7	614	4.1	631	5.4	636	5.7	643	6.6
29	563	1.7	581	2.5	610	3.9	626	5.1	632	5.5	638	5.9
28	559	1.5	577	2.3	606	3.7	622	4.8	628	5.2	634	5.6
27	555	1.4	573	2.1	602	3.5	618	4.5	624	4.9	630	5.4
26	552	1.2	570	2.0	598	3.3	614	4.1	620	4.6	626	5.1
25	548	1.1	566	1.8	594	3.1	610	3.9	617	4.4	622	4.8
24	544	1.0	562	1.7	591	3.0	606	3.7	613	4.1	618	4.5
23	541	K.9	559	1.5	587	2.8	602	3.5	609	3.9	614	4.1
22	537	K.7	555	1.4	583	2.6	598	3.3	605	3.7	610	3.9
21	533	K.6	551	1.2	580	2.5	594	3.1	602	3.5	606	3.7
20	530	K.5	548	1.1	576	2.3	590	2.9	598	3.3	602	3.5
19	526	K.4	544	1.0	572	2.1	586	2.7	594	3.1	598	3.3
18	522	K.3	540	K.8	569	2.0	582	2.5	590	2.9	594	3.1
17	518	K.2	536	K.7	565	1.8	578	2.4	586	2.7	590	2.9
16	515	K.1	532	K.6	561	1.6	574	2.2	582	2.5	586	2.7
15	511	K.0	528	K.5	557	1.5	570	2.0	578	2.4	582	2.5
14	506	PK	524	K.3	553	1.3	565	1.8	574	2.2	577	2.3
13	502	PK	520	K.2	549	1.1	560	1.6	569	2.0	573	2.1
12	498	PK	515	K.1	544	1.0	556	1.4	565	1.8	568	1.9
11	493	PK	511	K.0	540	K.8	551	1.2	560	1.6	563	1.7
10	488	PK	506	PK	535	K.7	545	1.0	555	1.4	558	1.5
9	483	PK	500	PK	530	K.5	540	K.8	549	1.1	553	1.3
8	477	PK	495	PK	524	K.3	534	K.6	544	1.0	547	1.0
7	471	PK	489	PK	518	K.2	527	K.4	537	K.7	540	K.8
6	464	PK	482	PK	511	K.0	520	K.2	530	K.5	533	K.6
5	456	PK	474	PK	503	PK	512	K.0	522	K.3	525	K.4
4	446	PK	464	PK	494	PK	502	PK	513	K.0	515	K.1
3	435	PK	453	PK	483	PK	490	PK	501	PK	504	PK
2	419	PK	437	PK	467	PK	474	PK	485	PK	488	PK
1	393	PK	411	PK	441	PK	448	PK	459	PK	462	PK

LISTENING (con't)

Raw Score	Advanced 1		Advanced 2					
	SS	GE	SS	GE				
60								
59								
58								
57								
56								
55								
54								
53								
52								
51								
50								
49								
48								
47								
46								
45	799	PHS	803	PHS				
44	775	PHS	780	PHS				
43	748	PHS	754	PHS				
42	731	PHS	739	PHS				
41	719	PHS	727	PHS				
40	709	PHS	718	PHS				
39	701	PHS	710	PHS				
38	694	PHS	703	PHS				
37	687	PHS	697	PHS				
36	681	11.8	692	PHS				
35	676	11.0	686	12.8				
34	671	10.1	681	11.8				
33	666	8.9	677	11.2				
32	661	8.4	672	10.3				
31	657	8.0	668	9.3				
30	653	7.7	664	8.7				
29	649	7.3	660	8.3				
28	645	6.8	656	7.9				
27	641	6.3	652	7.6				
26	637	5.8	648	7.2				
25	633	5.5	645	6.8				
24	629	5.3	641	6.3				
23	626	5.1	637	5.8				
22	622	4.8	634	5.6				
21	618	4.5	630	5.4				
20	614	4.1	626	5.1				
19	611	4.0	623	4.9				
18	607	3.8	619	4.5				
17	603	3.6	615	4.2				
16	599	3.4	611	4.0				
15	595	3.2	607	3.8				
14	590	2.9	603	3.6				
13	586	2.7	598	3.3				
12	582	2.5	594	3.1				
11	577	2.3	589	2.9				
10	572	2.1	584	2.6				
9	566	1.8	579	2.4				
8	561	1.6	573	2.1				
7	554	1.3	567	1.9				
6	547	1.0	560	1.6				
5	539	K.8	552	1.2				
4	530	K.5	542	K.9				
3	518	K.2	531	K.6				
2	502	PK	515	K.1				
1	476	PK	489	PK				

INTERPRETING PERCENTILE RANKS FOR HEARING IMPAIRED STUDENTS ADMINISTERED THE 8th EDITION STANFORD ACHIEVEMENT TEST, FORM J

Before using the age-based percentile ranks contained in the next section of this booklet, the teacher or test administrator should review the following paragraphs regarding percentile ranks.

Percentile ranks for hearing impaired students are computed for the various age groups of hearing impaired students. For example, a percentile of 50 in Reading Comprehension for a 10-year-old means that the student's Reading Comprehension achievement is better than the Reading Comprehension achievement level of 50 percent of all 10-year-old hearing impaired students in the 1990 norming sample. **The percentiles for each age group are computed across all SAT-8 levels at which a particular subtest or subject area appears**. This means that each age group contains hearing impaired students who took different levels of the test. In designing the sample, a large amount of effort went into assuring that the resulting norms would represent the entire population of hearing impaired students at given ages and would be accurate to within three percentile points. Thus, when you see a 50 printed as a 10-year-old student's percentile rank, you can be somewhat confident that, **if** the test had been given to all 10-year-old hearing impaired students in the country, the student's true percentile rank would fall between 47 and 53.

There are two important pieces of information that you need to be aware of before you study the percentile ranks of your students: 1) not all subtest areas are contained in each of the eight test levels, and this greatly influences the percentile values; 2) some subtests were not administered to large numbers of hearing impaired students in the norming project.

Special Note #1: If a subtest is completely missing from the age-based percentile rank tables, this means either that there was not a sufficient number of hearing impaired students in the 1990 norming project to calculate percentile ranks for this particular subtest (e.g., Environment) or that the subtest was not considered appropriate for many hearing impaired students (e.g., Vocabulary, Word Study Skills, Listening.)

There were insufficient numbers of 7-year-old hearing impaired students in the norming project to calculate percentile ranks for this age group. Similarly, there are no percentile rank tables for hearing impaired students above age 20.

Special Note #2: For certain subtests there were insufficient numbers of hearing impaired students at some of the age categories to calculate percentile ranks. Consequently, these particular subtest categories will be blank in the age-based tables.

Special Note #3: Some SAT-8 subtests appear only at certain levels of the Stanford (e.g., Language Mechanics and Language Expression, which appear only at the Primary 3 through Advanced levels). A possible result would be a 15-year-old student scoring in the 22nd percentile in Language and the 42nd percentile in Language Mechanics. The reason for this seeming discrepancy is that the Language subtest appears at all eight levels of the SAT-8. Therefore, the 15-year-old is being compared to a larger group of students in the norming sample on the Language subtest than on the Language Mechanics subtest. The latter subtest was taken only by those 15-year-old students who screened out to one of the six upper levels of the SAT-8 in the 1990 norming sample.

Special Note #4: There are two sets of age-based percentile rank tables in this section of the booklet. One is based on **all** hearing impaired students in the 1990 norming project, regardless of severity of hearing loss. The second, beginning on page 54 is based only on those students in the norming project who were reported to have a severe - profound hearing loss. (The definition of *severe* to *profound* loss was that used in the Annual Survey of Hearing Impaired Children and Youth: an average hearing threshold of 71 dB or higher across the speech frequency range in the better ear.) Thus, using these percentile rank tables based on severity of hearing loss, a school will be comparing its students only to severely and profoundly hearing impaired students in the 1990 norming project. There are **no** separate percentile rank tables in this booklet for students with less-than-severe hearing losses (i.e., those with a hearing threshold of 70 dB or less.)

Any omissions of age categories in these percentile rank tables according to degree of hearing loss are due to insufficient numbers of students in the norming project.

Special Note #5: The **initial** sample of students selected for the norming project was representative of the full Annual Survey of Hearing Impaired Children and Youth. However, the **final** sample of students participating in the norming project deviated from the Annual Survey in terms of program type and level of hearing loss. While this deviation varied by age and by ethnic group, the overall sample underrepresented hearing impaired students in local schools and those with less-than-severe hearing losses. Therefore, the final sample of students on whom the percentile norms for this booklet were calculated was weighted according to program type and hearing loss for each ethnic group within each age group. For further information on this weighting procedure, consult the technical manual for the 1990 norming project, which will be published by CADS in late 1991.

Age-based Percentile Ranks

for

Hearing Impaired Students

All levels of hearing loss

AGE 8

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	627-816	616-822	622-832	624-841	651-830	640-826						99
98	620-626	610-615	613-621	611-623	621-650	631-639						98
97	615-619	607-609	612	602-610	611-620	620-630						97
96	610-614	599-606	606-611	586-601	607-610	609-619						96
95	604-609	591-598	603-605	582-585	604-606	604-608						95
94	598-603	586-590	593-602	579-581	603	595-603						94
93	593-597	577-585	587-592	573-578	596-602	593-594						93
92	587-592	-	586	-	-	588-592						92
91	582-586	571-576	581-585	-	590-595	583-587	I	I	I	I	I	91
90	-	570	-	566-572	589	579-582						90
89	578-581	565-569	580	561-565	-	-	N	N	N	N	N	89
88	576-577	564	574-579	560	-	-						88
87	569-575	560-563	-	555-559	583-588	574-578	S	S	S	S	S	87
86	567-568	-	568-573	-	-	-						86
85	564-566	557-559	567	550-554	577-582	570-573	U	U	U	U	U	85
84	558-563	555-556	564-566	-	-	-						84
83	555-557	554	-	549	573-576	-	F	F	F	F	F	83
82	553-554	550-553	-	544-548	566-572	563-569						82
81	552	549	563	541-543	-	562	F	F	F	F	F	81
80	550-551	548	-	-	-	559-561						80
79	549	547	557-562	540	562-565	557-558	I	I	I	I	I	79
78	545-548	544-546	-	539	-	555-556						78
77	544	540-543	-	-	-	552-554	C	C	C	C	C	77
76	541-543	-	555-556	538	-	551						76
75	540	539	552-554	534-537	561	548-550	I	I	I	I	I	75
74	537-539	-	-	533	-	-						74
73	-	-	-	-	554-560	544-547	E	E	E	E	E	73
72	534-536	537-538	-	528-532	552-553	-						72
71	-	534-536	-	526-527	-	543	N	N	N	N	N	71
70	532-533	-	-	-	-	540-542						70
69	529-531	-	-	524-525	-	539	T	T	T	T	T	69
68	527-528	-	548-551	523	551	537-538						68
67	524-526	-	547	519-522	-	535-536						67
66	520-523	-	-	-	546-550	534						66
65	515-519	529-533	-	-	543-545	-	D	D	D	D	D	65
64	511-514	-	544-546	518	-	-						64
63	506-510	-	542-543	513-517	-	530-533	A	A	A	A	A	63
62	-	528	-	-	-	-						62
61	502-505	525-527	-	-	540-542	526-529	T	T	T	T	T	61
60	498-501	-	-	507-512	536-539	523-525						60
59	-	-	-	-	-	-	A	A	A	A	A	59
58	-	522-524	537-541	-	-	-						58
57	-	-	-	-	-	-						57
56	494-497	-	536	503-506	-	521-522						56
55	-	520-521	533-535	501-502	533-535	519-520						55
54	490-493	-	-	-	529-532	-						54
53	-	516-519	-	-	-	-						53
52	-	-	532	-	-	-						52
51	-	515	-	-	524-528	517-518						51
50	-	514	527-531	-	523	515-516						50

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AGE 8

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	485-489	511-513	-	496-500	-	-						49
48	-	509-510	525-526	495	-	-						48
47	-	-	-	-	521-522	512-514						47
46	481-484	-	-	-	517-520	-						46
45	-	506-508	522-524	-	-	-						45
44	-	-	518-521	-	-	-						44
43	477-480	504-505	-	489-494	-	508-511						43
42	-	500-503	-	-	-	-						42
41	-	-	517	-	511-516	-	I	I	I	I	I	41
40	-	-	516	-	-	-						40
39	-	-	512-515	488	-	-	N	N	N	N	N	39
38	-	499	511	484-487	-	504-507						38
37	473-476	495-498	-	-	506-510	-	S	S	S	S	S	37
36	-	-	-	-	-	-						36
35	-	-	506-510	-	-	501-503	U	U	U	U	U	35
34	-	-	505	-	-	-						34
33	468-472	493-494	501-504	478-483	-	-	F	F	F	F	F	33
32	-	492	499-500	-	500-505	-						32
31	-	490-491	-	-	-	-	F	F	F	F	F	31
30	-	-	492-498	472-477	-	-						30
29	464-467	-	-	-	-	500	I	I	I	I	I	29
28	-	487-489	490-491	-	495-499	497-499						28
27	-	-	486-489	466-471	-	-	C	C	C	C	C	27
26	-	485-486	-	-	-	-						26
25	-	-	-	-	489-494	493-496	I	I	I	I	I	25
24	-	483-484	479-485	-	-	-						24
23	459-463	479-482	478	-	-	-	E	E	E	E	E	23
22	-	-	474-477	460-465	-	-						22
21	-	-	-	-	486-488	491-492	N	N	N	N	N	21
20	-	478	-	-	484-485	490						20
19	-	474-477	467-473	-	-	-	T	T	T	T	T	19
18	-	-	-	-	-	-						18
17	-	469-473	-	454-459	-	486-489						17
16	457-458	-	-	-	479-483	-						16
15	455-456	-	461-466	-	-	-	D	D	D	D	D	15
14	-	-	-	447-453	-	-						14
13	-	463-468	-	-	473-478	482-485	A	A	A	A	A	13
12	-	-	457-460	-	-	-						12
11	450-454	457-462	454-456	-	-	-	T	T	T	T	T	11
10	-	-	-	440-446	472	-						10
9	-	-	447-453	-	468-471	479-481	A	A	A	A	A	9
8	-	451-456	446	433-439	-	478						8
7	-	-	-	432	463-467	-						7
6	-	-	438-445	-	457-462	-						6
5	444-449	437-450	432-437	-	449-456	474-477						5
4	-	-	429-431	424-431	-	-						4
3	439-443	429-436	425-428	417-423	448	470-473						3
2	-	421-428	415-424	408-416	435-447	465-469						2
1	347-438	341-420	383-414	345-407	360-434	369-464						1

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AGE 9

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	657-816	653-822	653-832	637-841	679-830	663-826						99
98	642-656	639-652	648-652	635-636	659-678	657-662						98
97	636-641	637-638	641-647	632-634	654-658	644-656						97
96	634-635	-	633-640	626-631	651-653	636-643						96
95	627-633	623-636	626-632	-	-	624-635						95
94	624-626	-	624-625	-	637-650	621-623						94
93	-	616-622	622-623	621-625	631-636	615-620						93
92	617-623	614-615	617-621	616-620	625-630	612-614						92
91	611-616	610-613	614-616	612-615	623-624	611	I	I	I	I	I	91
90	609-610	604-609	613	606-611	621-622	609-610						90
89	608	-	-	599-605	619-620	606-608	N	N	N	N	N	89
88	605-607	600-603	612	596-598	615-618	604-605						88
87	599-604	599	-	593-595	611-614	603	S	S	S	S	S	87
86	596-598	-	610-611	592	-	598-602						86
85	-	594-598	606-609	591	610	593-597	U	U	U	U	U	85
84	595	-	603-605	590	608-609	-						84
83	592-594	591-593	-	589	606-607	590-592	F	F	F	F	F	83
82	590-591	-	601-602	586-588	605	589						82
81	-	590	598-600	579-585	603-604	588	F	F	F	F	F	81
80	587-589	589	597	-	-	587						80
79	586	584-588	595-596	-	-	583-586	I	I	I	I	I	79
78	582-585	-	593-594	577-578	596-602	581-582						78
77	581	581-583	-	573-576	-	577-580	C	C	C	C	C	77
76	578-580	579-580	-	-	591-595	575-576						76
75	-	-	590-592	572	590	574	I	I	I	I	I	75
74	575-577	577-578	587-589	569-571	589	-						74
73	574	575-576	-	-	588	572-573	E	E	E	E	E	73
72	-	571-574	-	567-568	586-587	569-571						72
71	569-573	-	586	562-566	583-585	566-568	N	N	N	N	N	71
70	-	-	582-585	561	-	-						70
69	565-568	569-570	581	-	-	562-565	T	T	T	T	T	69
68	-	-	-	-	582	559-561						68
67	-	565-568	578-580	555-560	578-581	-						67
66	562-564	-	575-577	-	577	-						66
65	-	-	574	550-554	-	556-558	D	D	D	D	D	65
64	559-561	564	-	-	-	555						64
63	557-558	560-563	-	-	571-576	552-554	A	A	A	A	A	63
62	555-556	-	-	548-549	-	551						62
61	553-554	559	571-573	547	-	-	T	T	T	T	T	61
60	-	555-558	568-570	544-546	568-570	-						60
59	549-552	554	-	-	566-567	-	A	A	A	A	A	59
58	-	-	565-567	542-543	564-565	-						58
57	546-548	549-553	564	539-541	562-563	548-550						57
56	545	548	563	-	-	547						56
55	541-544	544-547	-	-	-	544-546						55
54	-	-	-	537-538	-	-						54
53	537-540	-	-	534-536	556-561	543						53
52	534-536	543	559-562	-	-	542						52
51	532-533	540-542	557-558	-	-	541						51
50	-	539	555-556	533	-	539-540						50

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AGE 9

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	529-531	537-538	552-554	530-532	552-555	537-538						49
48	527-528	534-536	-	528-529	-	-						48
47	526	530-533	-	527	551	534-536						47
46	524-525	529	-	526	-	-						46
45	520-523	-	-	-	546-550	530-533						45
44	515-519	-	544-551	523-525	-	-						44
43	511-514	528	542-543	-	543-545	-						43
42	-	-	-	519-522	-	-						42
41	506-510	525-527	-	518	540-542	526-529	I	I	I	I	I	41
40	504-505	522-524	539-541	513-517	-	-						40
39	498-503	-	537-538	-	536-539	524-525	N	N	N	N	N	39
38	494-497	-	-	-	-	523						38
37	-	520-521	535-536	508-512	-	-	S	S	S	S	S	37
36	490-493	517-519	533-534	507	535	521-522						36
35	-	516	532	-	530-534	519-520	U	U	U	U	U	35
34	485-489	515	527-531	-	-	-						34
33	-	-	525-526	501-506	529	517-518	F	F	F	F	F	33
32	-	514	-	-	-	515-516						32
31	481-484	511-513	-	-	-	-	F	F	F	F	F	31
30	-	509-510	522-524	-	-	512-514						30
29	-	-	-	495-500	524-528	-	I	I	I	I	I	29
28	477-480	506-508	518-521	-	523	508-511						28
27	-	504-505	517	490-494	-	-	C	C	C	C	C	27
26	-	-	512-516	489	517-522	504-507						26
25	-	-	-	-	-	-	I	I	I	I	I	25
24	473-476	-	-	-	511-516	-						24
23	-	500-503	511	484-488	-	-	E	E	E	E	E	23
22	-	-	-	-	-	-						22
21	-	499	506-510	478-483	510	501-503	N	N	N	N	N	21
20	468-472	495-498	505	-	506-509	-						20
19	-	-	501-504	-	-	-	T	T	T	T	T	19
18	-	493-494	-	472-477	503-505	497-500						18
17	-	490-492	499-500	-	500-502	-						17
16	467	487-489	494-498	-	-	-						16
15	464-466	-	492-493	466-471	495-499	493-496	D	D	D	D	D	15
14	-	485-486	490-491	-	-	-						14
13	459-463	479-484	486-489	461-465	-	-	A	A	A	A	A	13
12	-	477-478	481-485	460	489-494	490-492						12
11	-	474-476	475-480	-	-	-	T	T	T	T	T	11
10	-	469-473	474	459	484-488	-						10
9	455-458	-	467-473	454-458	481-483	486-489	A	A	A	A	A	9
8	-	-	461-466	-	479-480	484-485						8
7	-	463-468	-	-	-	482-483						7
6	450-454	457-462	455-460	447-453	-	-						6
5	-	-	451-454	-	473-478	479-481						5
4	444-449	451-456	446-450	440-446	468-472	477-478						4
3	-	-	437-445	424-439	463-467	474-476						3
2	441-443	444-450	429-436	-	455-462	470-473						2
1	347-440	341-443	363-428	345-423	360-454	369-469						1

AGE 10

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	676-816	670-822	681-832	692-841	710-830	667-826						99
98	651-675	665-669	680	652-691	686-709	658-666						98
97	644-650	-	672-679	645-651	674-685	652-657						97
96	-	-	665-671	634-644	659-673	645-651						96
95	639-643	645-664	659-664	632-633	656-658	639-644						95
94	631-638	641-644	655-658	628-631	652-655	638						94
93	629-630	637-640	653-654	625-627	651	633-637						93
92	628	634-636	644-652	622-624	646-650	632						92
91	627	628-633	635-643	-	643-645	-	I	I	I	I	I	91
90	625-626	623-627	-	620-621	642	625-631						90
89	621-624	622	-	618-619	637-641	622-624	N	N	N	N	N	89
88	619-620	-	634	616-617	632-636	620-621						88
87	617-618	618-621	629-633	-	631	618-619	S	S	S	S	S	87
86	614-616	-	-	611-615	629-630	615-617						86
85	609-613	610-617	625-628	-	625-628	614	U	U	U	U	U	85
84	608	609	624	601-610	-	609-613						84
83	605-607	-	-	599-600	622-624	-	F	F	F	F	F	83
82	604	-	622-623	594-598	621	607-608						82
81	602-603	-	-	593	620	-	F	F	F	F	F	81
80	599-601	604-606	621	589-592	617-619	604-606						80
79	596-598	-	619-620	587-588	615-616	598-603	I	I	I	I	I	79
78	593-595	602-603	-	586	-	-						78
77	-	600-601	614-618	-	611-614	596-597	C	C	C	C	C	77
76	590-592	-	-	-	-	593-595						76
75	-	-	613	583-585	-	590-592	I	I	I	I	I	75
74	587-589	599	-	580-582	-	588-589						74
73	584-586	595-598	612	579	610	-	E	E	E	E	E	73
72	582-583	594	609-611	577-578	607-609	-						72
71	578-581	591-593	606-608	575-576	605-606	-	N	N	N	N	N	71
70	577	590	-	573-574	603-604	583-587						70
69	-	589	-	-	-	582	T	T	T	T	T	69
68	575-576	585-588	603-605	-	-	580-581						68
67	574	584	601-602	569-572	600-602	575-579						67
66	-	-	598-600	-	-	574						66
65	571-573	-	595-597	567-568	596-599	572-573	D	D	D	D	D	65
64	569-570	-	-	-	-	570-571						64
63	568	580-583	594	566	-	569	A	A	A	A	A	63
62	567	579	593	565	594-595	-						62
61	565-566	578	590-592	562-564	589-593	566-568	T	T	T	T	T	61
60	562-564	575-577	587-589	561	-	-						60
59	-	574	-	-	587-588	565	A	A	A	A	A	59
58	-	571-573	586	-	583-586	562-564						58
57	560-561	569-570	585	-	-	-						57
56	558-559	566-568	582-584	557-560	578-582	559-561						56
55	557	564-565	581	556	-	558						55
54	555-556	561-563	-	555	577	555-557						54
53	554	560	579-580	552-554	573-576	552-554						53
52	553	-	574-578	550-551	572	551						52
51	-	-	-	-	566-571	-						51
50	549-552	559	-	-	562-565	-						50

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AGE 10

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	-	571-573	547-549	-	548-550						49
48	546-548	554-558	-	544-546	-	547						48
47	545	-	568-570	542-543	-	544-546						47
46	-	-	567	540-541	561	543						46
45	541-544	-	-	539	-	542						45
44	540	549-553	564-566	535-538	559-560	541						44
43	537-539	-	563	534	556-558	539-540						43
42	-	548	-	531-533	-	537-538						42
41	534-536	-	-	-	554-555	536	I	I	I	I	I	41
40	532-533	544-547	-	528-530	552-553	534-535						40
39	-	-	562	526-527	-	-	N	N	N	N	N	39
38	530-531	543	559-561	525	-	533						38
37	528-529	539-542	557-558	521-524	551	530-532	S	S	S	S	S	37
36	527	538	555-556	518-520	-	-						36
35	520-526	537	552-554	516-517	547-550	526-529	U	U	U	U	U	35
34	511-519	-	-	513-515	546	-						34
33	502-510	534-536	-	-	543-545	524-525	F	F	F	F	F	33
32	498-501	-	547-551	507-512	-	523						32
31	496-497	-	-	-	-	522	F	F	F	F	F	31
30	494-495	531-533	543-546	-	541-542	519-521						30
29	-	529-530	542	-	540	-	I	I	I	I	I	29
28	490-493	-	-	-	536-539	515-518						28
27	-	525-528	540-541	501-506	-	-	C	C	C	C	C	27
26	485-489	-	539	-	-	-						26
25	-	520-524	537-538	-	530-535	512-514	I	I	I	I	I	25
24	484	-	536	-	529	-						24
23	481-483	516-519	533-535	498-500	524-528	508-511	E	E	E	E	E	23
22	-	515	531-532	495-497	519-523	-						22
21	477-480	-	527-530	490-494	517-518	504-507	N	N	N	N	N	21
20	-	509-514	-	489	-	-						20
19	473-476	-	525-526	-	-	502-503	T	T	T	T	T	19
18	-	506-508	522-524	-	511-516	501						18
17	-	504-505	518-521	484-488	-	-						17
16	468-472	502-503	-	-	506-510	-						16
15	-	496-501	511-517	-	-	497-500	D	D	D	D	D	15
14	-	495	508-510	-	498-505	-						14
13	-	490-494	506-507	478-483	495-497	493-496	A	A	A	A	A	13
12	-	487-489	505	-	-	-						12
11	464-467	-	501-504	-	489-494	490-492	T	T	T	T	T	11
10	-	479-486	496-500	472-477	-	-						10
9	463	477-478	491-495	466-471	487-488	488-489	A	A	A	A	A	9
8	459-462	469-476	490	-	484-486	486-487						8
7	-	-	486-489	460-465	-	482-485						7
6	-	463-468	480-485	454-459	479-483	-						6
5	455-458	460-462	474-479	-	473-478	480-481						5
4	-	457-459	461-473	447-453	-	478-479						4
3	450-454	451-456	452-460	439-446	468-472	-						3
2	444-449	447-450	438-451	431-438	462-467	474-477						2
1	347-443	341-446	363-437	345-430	360-461	369-473						1

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AGE 11

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	696-816	695-822	696-832	700-841	719-830	679-826						99
98	684-695	688-694	-	679-699	709-718	668-678						98
97	671-683	684-687	693-695	674-678	688-708	664-667						97
96	661-670	676-683	684-692	668-673	683-687	659-663						96
95	658-660	673-675	680-683	655-667	675-682	654-658						95
94	654-657	665-672	672-679	654	673-674	650-653						94
93	651-653	-	-	651-653	668-672	649						93
92	649-650	657-664	671	650	662-667	645-648						92
91	639-648	654-656	669-670	646-649	659-661	640-644	I	I	I	I	I	91
90	635-638	651-653	665-668	645	656-658	638-639						90
89	633-634	645-650	-	640-644	651-655	632-637	N	N	N	N	N	89
88	631-632	639-644	660-664	635-639	-	627-631						88
87	630	-	659	631-634	-	625-626	S	S	S	S	S	87
86	624-629	637-638	653-658	626-630	646-650	622-624						86
85	623	634-636	-	-	643-645	621	U	U	U	U	U	85
84	-	631-633	651-652	621-625	642	620						84
83	621-622	629-630	648-650	618-620	641	619	F	F	F	F	F	83
82	617-620	628	646-647	614-617	637-640	617-618						82
81	-	-	643-645	613	-	616	F	F	F	F	F	81
80	614-616	-	642	611-612	634-636	615						80
79	613	-	641	610	631-633	614	I	I	I	I	I	79
78	611-612	623-627	639-640	607-609	628-630	612-613						78
77	-	-	636-638	603-606	625-627	-	C	C	C	C	C	77
76	609-610	-	635	602	-	609-611						76
75	608	618-622	-	-	623-624	-	I	I	I	I	I	75
74	605-607	-	634	601	-	608						74
73	602-604	616-617	-	599-600	622	607	E	E	E	E	E	73
72	599-601	614-615	629-633	-	621	-						72
71	-	610-613	-	597-598	620	605-606	N	N	N	N	N	71
70	596-598	609	-	594-596	-	604						70
69	-	-	624-628	593	-	600-603	T	T	T	T	T	69
68	593-595	-	-	591-592	-	598-599						68
67	-	-	-	590	615-619	597						67
66	590-592	605-608	622-623	-	-	596						66
65	587-589	604	621	586-589	-	595	D	D	D	D	D	65
64	-	-	-	583-585	-	594						64
63	584-586	600-603	619-620	582	611-614	593	A	A	A	A	A	63
62	-	-	-	579-581	610	-						62
61	581-583	599	617-618	-	607-609	590-592	T	T	T	T	T	61
60	-	595-598	614-616	-	605-606	-						60
59	578-580	-	613	577-578	-	588-589	A	A	A	A	A	59
58	577	594	612	575-576	603-604	587						58
57	575-576	590-593	609-611	573-574	-	585-586						57
56	574	589	606-608	-	600-602	583-584						56
55	573	585-588	-	571-572	596-599	582						55
54	571-572	584	-	568-570	-	581						54
53	570	-	603-605	567	-	578-580						53
52	568-569	580-583	-	566	595	575-577						52
51	565-567	579	602	565	-	572-574						51
50	-	-	600-601	562-564	591-594	570-571						50

AGE 11

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	575-578	598-599	561	-	569						49
48	562-564	574	597	-	-	567-568						48
47	558-561	-	595-596	557-560	589-590	566						47
46	557	570-573	594	556	587-588	563-565						46
45	-	569	593	555	-	560-562						45
44	-	-	591-592	554	583-586	558-559						44
43	555-556	565-568	590	552-553	-	556-557						43
42	553-554	564	587-589	550-551	582	555						42
41	552	-	-	-	578-581	551-554	I	I	I	I	I	41
40	549-551	-	583-586	-	577	-						40
39	547-548	560-563	582	547-549	-	549-550	N	N	N	N	N	39
38	545-546	-	-	545-546	573-576	548						38
37	-	559	581	544	571-572	-	S	S	S	S	S	37
36	-	-	578-580	542-543	570	544-547						36
35	541-544	554-558	-	539-541	569	543	U	U	U	U	U	35
34	-	-	574-577	537-538	566-568	541-542						34
33	540	549-553	-	-	-	539-540	F	F	F	F	F	33
32	537-539	-	571-573	536	564-565	537-538						32
31	-	548	568-570	534-535	562-563	-	F	F	F	F	F	31
30	-	-	-	528-533	-	534-536						30
29	533-536	544-547	567	526-527	561	530-533	I	I	I	I	I	29
28	529-532	543	565-566	525	559-560	-						28
27	527-528	-	563-564	523-524	556-558	526-529	C	C	C	C	C	27
26	525-526	540-542	-	520-522	-	-						26
25	515-524	539	-	518-519	-	523-525	I	I	I	I	I	25
24	511-514	537-538	-	-	552-555	-						24
23	506-510	-	559-562	514-517	-	-	E	E	E	E	E	23
22	502-505	-	558	513	551	-						22
21	498-501	534-536	557	-	543-550	519-522	N	N	N	N	N	21
20	497	533	552-556	507-512	-	518						20
19	490-496	530-532	-	-	-	515-517	T	T	T	T	T	19
18	-	525-529	-	-	536-542	514						18
17	485-489	-	-	501-506	-	512-513						17
16	-	522-524	548-551	-	-	-						16
15	481-484	516-521	-	496-500	535	508-511	D	D	D	D	D	15
14	-	515	543-547	495	529-534	504-507						14
13	477-480	511-514	542	490-494	524-528	-	A	A	A	A	A	13
12	473-476	509-510	-	489	523	-						12
11	-	506-508	537-541	484-488	518-522	501-503	T	T	T	T	T	11
10	-	504-505	534-536	-	517	497-500						10
9	468-472	499-503	532-533	480-483	511-516	493-496	A	A	A	A	A	9
8	464-467	495-498	522-531	478-479	506-510	490-492						8
7	-	493-494	518-521	-	-	-						7
6	459-463	490-492	514-517	472-477	500-505	486-489						6
5	-	487-489	506-513	466-471	495-499	-						5
4	455-458	476-486	493-505	-	-	482-485						4
3	450-454	463-475	484-492	460-465	489-494	478-481						3
2	444-449	457-462	463-483	454-459	478-488	474-477						2
1	347-443	341-456	363-462	345-453	360-477	369-473						1

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AGE 12

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	697-816	699-822	714-832	705-841	716-830	712-826						99
98	689-696	697-698	702-713	691-704	700-715	689-711						98
97	683-688	695-696	696-701	683-690	689-699	681-688						97
96	678-682	-	693-695	672-682	680-688	670-680						96
95	674-677	691-694	688-692	670-671	-	665-669						95
94	667-673	687-690	687	664-669	675-679	663-664						94
93	661-666	683-686	681-686	662-663	673-674	659-662						93
92	660	676-682	679-680	654-661	672	-						92
91	655-659	-	675-678	648-653	667-671	657-658	I	I	I	I	I	91
90	654	673-675	-	646-647	665-666	654-656						90
89	650-653	672	-	638-645	663-664	651-653	N	N	N	N	N	89
88	648-649	667-671	672-674	634-637	662	649-650						88
87	643-647	662-666	668-671	633	660-661	648	S	S	S	S	S	87
86	639-642	658-661	664-667	632	658-659	646-647						86
85	637-638	654-657	661-663	631	656-657	645	U	U	U	U	U	85
84	635-636	651-653	660	629-630	-	-						84
83	633-634	-	-	624-628	655	644	F	F	F	F	F	83
82	625-632	648-650	-	622-623	653-654	641-643						82
81	623-624	-	659	621	652	638-640	F	F	F	F	F	81
80	621-622	646-647	657-658	620	651	635-637						80
79	620	645	655-656	618-619	647-650	-	I	I	I	I	I	79
78	618-619	643-644	653-654	-	646	632-634						78
77	614-617	642	-	613-617	645	-	C	C	C	C	C	77
76	-	639-641	650-652	611-612	643-644	631						76
75	-	635-638	648-649	-	-	628-630	I	I	I	I	I	75
74	-	634	646-647	610	-	-						74
73	611-613	-	643-645	607-609	641-642	626-627	E	E	E	E	E	73
72	-	-	642	606	637-640	623-625						72
71	608-610	633	-	602-605	-	621-622	N	N	N	N	N	71
70	-	-	639-641	-	636	619-620						70
69	-	630-632	-	-	-	618	T	T	T	T	T	69
68	605-607	-	638	599-601	634-635	616-617						68
67	602-604	629	635-637	-	631-633	-						67
66	-	628	634	597-598	-	615						66
65	599-601	-	631-633	594-596	-	612-614	D	D	D	D	D	65
64	-	-	-	592-593	628-630	611						64
63	596-598	625-627	629-630	-	626-627	609-610	A	A	A	A	A	63
62	593-595	623-624	-	587-591	623-625	608						62
61	-	-	626-628	-	622	607	T	T	T	T	T	61
60	590-592	620-622	625	586	621	604-606						60
59	-	619	624	583-585	620	601-603	A	A	A	A	A	59
58	-	618	623	-	616-619	600						58
57	588-589	-	622	581-582	615	598-599						57
56	587	616-617	-	-	611-614	597						56
55	-	614-615	621	579-580	-	593-596						55
54	584-586	-	620	-	609-610	591-592						54
53	-	611-613	-	577-578	607-608	588-590						53
52	582-583	610	617-619	575-576	604-606	-						52
51	581	609	-	-	603	-						51
50	-	-	614-616	574	-	586-587						50

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AGE 12

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	578-580	-	613	573	600-602	585						49
48	576-577	604-608	612	-	-	-						48
47	574-575	-	-	572	-	582-584						47
46	-	-	610-611	569-571	-	580-581						46
45	571-573	600-603	609	567-568	596-599	579						45
44	569-570	596-599	608	566	-	-						44
43	568	594-595	606-607	565	593-595	578						43
42	-	590-593	-	562-564	591-592	574-577						42
41	565-567	589	-	561	-	571-573	I	I	I	I	I	41
40	564	585-588	603-605	-	589-590	569-570						40
39	562-563	584	-	558-560	-	566-568	N	N	N	N	N	39
38	560-561	-	602	556-557	587-588	-						38
37	558-559	-	601	555	583-586	564-565	S	S	S	S	S	37
36	-	580-583	598-600	-	-	562-563						36
35	557	-	595-597	550-554	582	559-561	U	U	U	U	U	35
34	555-556	579	-	-	579-581	-						34
33	-	577-578	594	547-549	578	555-558	F	F	F	F	F	33
32	553-554	574-576	592-593	-	577	-						32
31	551-552	570-573	587-591	543-546	576	-	F	F	F	F	F	31
30	549-550	569	586	539-542	571-575	551-554						30
29	-	565-568	583-585	-	-	548-550	I	I	I	I	I	29
28	546-548	564	-	537-538	570	544-547						28
27	545	561-563	582	534-536	566-569	543	C	C	C	C	C	27
26	-	560	581	531-533	564-565	541-542						26
25	541-544	554-559	578-580	528-530	562-563	-	I	I	I	I	I	25
24	-	-	574-577	525-527	-	539-540						24
23	537-540	549-553	-	523-524	-	-	E	E	E	E	E	23
22	-	548	571-573	519-522	561	537-538						22
21	532-536	543-547	-	518	556-560	534-536	N	N	N	N	N	21
20	527-531	541-542	568-570	513-517	-	-						20
19	526	539-540	566-567	507-512	552-555	530-533	T	T	T	T	T	19
18	520-525	537-538	563-565	-	-	526-529						18
17	506-519	534-536	562	501-506	551	-						17
16	498-505	-	554-561	-	546-550	523-525						16
15	494-497	531-533	552-553	496-500	543-545	-	D	D	D	D	D	15
14	490-493	529-530	-	-	-	519-522						14
13	488-489	525-528	548-551	493-495	542	-	A	A	A	A	A	13
12	481-487	520-524	547	490-492	537-541	515-518						12
11	-	515-519	542-546	489	535-536	514	T	T	T	T	T	11
10	477-480	509-514	540-541	-	530-534	512-513						10
9	-	505-508	537-539	484-488	529	504-511	A	A	A	A	A	9
8	473-476	499-504	532-536	479-483	523-528	501-503						8
7	471-472	494-498	527-531	478	517-522	-						7
6	468-470	493	-	472-477	512-516	493-500						6
5	464-467	487-492	522-526	463-471	508-511	490-492						5
4	-	485-486	515-521	457-462	506-507	486-489						4
3	459-463	476-484	499-514	447-456	500-505	482-485						3
2	450-458	469-475	480-498	432-446	495-499	-						2
1	347-449	341-468	363-479	345-431	360-494	369-481						1

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AGE 13

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	692-816	734-822	742-832	741-841	741-830	688-826	705-808	723-795				99
98	688-691	715-733	722-741	721-740	727-740	676-687	692-704	689-722				98
97	679-687	708-714	720-721	704-720	716-726	674-675	686-691	681-688				97
96	673-678	703-707	710-719	693-703	711-715	673	681-685	676-680				96
95	670-672	-	704-709	-	702-710	671-672	680	674-675				95
94	667-669	697-702	699-703	687-692	696-701	-	675-679	670-673				94
93	662-666	695-696	696-698	683-686	691-695	668-670	674	669				93
92	659-661	694	-	682	685-690	667	673	668				92
91	658	689-693	695	679-681	683-684	662-666	672	663-667	I	I	I	91
90	655-657	686-688	693-694	678	680-682	659-661	667-671	-				90
89	649-654	-	688-692	675-677	675-679	657-658	-	-	N	N	N	89
88	648	677-685	-	671-674	-	655-656	663-666	657-662				88
87	647	673-676	686-687	667-670	-	653-654	661-662	655-656	S	S	S	87
86	646	672	680-685	664-666	673-674	650-652	-	652-654				86
85	-	671	679	659-663	672	649	659-660	651	U	U	U	85
84	644-645	669-670	676-678	-	670-671	648	658	-				84
83	643	667-668	675	653-658	668-669	647	656-657	-	F	F	F	83
82	641-642	665-666	-	652	-	645-646	653-655	649-650				82
81	640	664	674	650-651	664-667	-	-	-	F	F	F	81
80	638-639	661-663	672-673	646-649	662-663	-	-	647-648				80
79	637	657-660	671	645	661	644	-	-	I	I	I	79
78	-	-	670	643-644	660	642-643	-	646				78
77	634-636	655-656	669	640-642	659	638-641	650-652	643-645	C	C	C	77
76	631-633	654	668	636-639	656-658	-	647-649	641-642				76
75	628-630	652-653	-	634-635	653-655	635-637	-	-	I	I	I	75
74	-	651	665-667	633	-	-	-	640				74
73	626-627	-	-	-	651-652	632-634	646	636-639	E	E	E	73
72	623-625	650	662-664	632	-	628-631	644-645	635				72
71	621-622	649	660-661	631	650	624-627	641-643	-	N	N	N	71
70	617-620	648	-	626-630	649	623	639-640	634				70
69	616	646-647	658-659	625	646-648	-	638	-	T	T	T	69
68	614-615	644-645	656-657	622-624	-	622	-	632-633				68
67	612-613	642-643	653-655	621	643-645	619-621	-	630-631				67
66	611	639-641	652	619-620	-	618	636-637	-				66
65	-	-	651	618	642	-	-	627-629	D	D	D	65
64	609-610	-	-	616-617	641	615-617	635	626				64
63	608	637-638	648-650	614-615	637-640	-	633-634	-	A	A	A	63
62	-	-	647	613	636	-	632	-				62
61	605-607	634-636	646	611-612	632-635	613-614	631	-	T	T	T	61
60	-	-	643-645	607-610	-	612	629-630	625				60
59	-	633	642	606	631	-	-	622-624	A	A	A	59
58	602-604	630-632	640-641	602-605	628-630	609-611	626-628	-				58
57	-	629	638-639	599-601	627	-	623-625	-				57
56	-	628	636-637	598	626	-	-	620-621				56
55	599-601	-	635	597	624-625	-	622	-				55
54	596-598	-	-	-	622-623	-	-	-				54
53	-	625-627	634	594-596	621	608	-	617-619				53
52	-	623-624	631-633	593	-	607	621	615-616				52
51	593-595	-	629-630	592	620	-	620	-				51
50	-	-	-	590-591	619	605-606	-	614				50

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AGE 13 (con't) **AGE 13** **AGE 13 (con't)**

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	590-592	622	-	587-589	615-618	604	616-619	-				49
48	-	620-621	627-628	-	-	-	-	611-613				48
47	587-589	618-619	-	586	612-614	602-603	-	-				47
46	-	614-617	625-626	-	611	598-601	-	610				46
45	586	-	624	-	-	-	-	609				45
44	584-585	-	-	583-585	610	596-597	615	-				44
43	581-583	-	-	581-582	609	593-595	613-614	-				43
42	579-580	610-613	-	579-580	605-608	-	610-612	-				42
41	578	609	620-623	578	-	590-592	-	606-608	I	I	I	41
40	-	-	-	575-577	-	588-589	-	-				40
39	577	-	-	573-574	603-604	585-587	-	603-605	N	N	N	39
38	575-576	605-608	619	-	-	583-584	-	602				38
37	574	604	617-618	569-572	600-602	582	-	601	S	S	S	37
36	571-573	-	614-616	-	-	579-581	-	599-600				36
35	569-570	603	613	567-568	599	575-578	604-609	-	U	U	U	35
34	-	600-602	610-612	566	591-598	572-574	-	598				34
33	-	599	608-609	562-565	-	570-571	-	-	F	F	F	33
32	568	-	605-607	561	589-590	567-569	-	-				32
31	565-567	596-598	602-604	-	-	566	-	596-597	F	F	F	31
30	-	594-595	601	557-560	587-588	-	-	594-595				30
29	562-564	591-593	598-600	-	585-586	562-565	-	-	I	I	I	29
28	-	590	597	555-556	583-584	-	-	593				28
27	558-561	585-589	593-596	552-554	-	560-561	599-603	-	C	C	C	27
26	557	-	591-592	550-551	582	559	-	-				26
25	555-556	584	590	547-549	-	558	-	-	I	I	I	25
24	-	580-583	-	542-546	-	555-557	-	-				24
23	553-554	579	587-589	539-541	578-581	552-554	-	-	E	E	E	23
22	-	578	586	534-538	577	548-551	-	591-592				22
21	549-552	574-577	582-585	-	-	544-547	597-598	-	N	N	N	21
20	548	-	-	-	573-576	-	593-596	587-590				20
19	545-547	565-573	578-581	531-533	571-572	541-543	-	-	T	T	T	19
18	-	564	574-577	528-530	568-570	-	-	585-586				18
17	541-544	560-563	-	526-527	566-567	538-540	-	582-584				17
16	539-540	558-559	572-573	525	562-565	535-537	-	-				16
15	537-538	548-557	568-571	523-524	556-561	534	588-592	581	D	D	D	15
14	532-536	-	567	518-522	-	530-533	-	577-580				14
13	-	544-547	564-566	513-517	552-555	526-529	583-587	575-576	A	A	A	13
12	524-531	543	563	507-512	-	523-525	-	571-574				12
11	511-523	539-542	559-562	506	551	-	-	-	T	T	T	11
10	506-510	537-538	557-558	501-505	546-550	-	-	-				10
9	499-505	534-536	553-556	496-500	543-545	519-522	577-582	-	A	A	A	9
8	485-497	531-533	547-552	490-495	536-542	515-518	-	570				8
7	481-484	529-530	543-546	489	535	512-514	575-576	568-569				7
6	477-480	515-528	537-542	-	529-534	504-511	572-574	566-567				6
5	473-476	504-514	525-536	483-488	523-528	501-503	-	565				5
4	468-472	493-503	513-524	478-482	514-522	493-500	567-571	560-564				4
3	-	486-492	499-512	477	506-513	490-492	561-566	554-559				3
2	461-467	474-485	492-498	460-476	500-505	480-489	554-560	545-553				2
1	347-460	341-473	363-491	345-459	360-499	369-479	458-553	460-544				1

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AGE 14

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	716-816	749-822	754-832	733-841	786-830	706-826	706-808	744-795	780-807	695-812	706-809	99
98	701-715	731-748	748-753	721-732	755-785	686-705	698-705	700-743	706-779	687-694	701-705	98
97	692-700	728-730	731-747	713-720	720-754	685	686-697	685-699	700-705	682-686	696-700	97
96	684-691	722-727	724-730	707-712	714-719	681-684	-	682-684	-	674-681	692-695	96
95	680-683	715-721	722-723	698-706	711-713	671-680	683-687	676-681	693-699	670-673	690-691	95
94	678-679	713-714	717-721	-	706-710	667-670	680-682	669-675	-	662-669	689	94
93	673-677	705-712	713-716	690-697	701-705	662-666	675-679	668	690-692	661	677-688	93
92	667-672	702-704	712	688-689	695-700	-	674	663-667	686-689	-	665-676	92
91	663-666	697-701	709-711	686-687	692-694	659-661	673	662	-	658-660	660-664	91
90	656-662	696	708	681-685	691	-	-	-	673-685	655-657	658-659	90
89	653-655	695	-	679-680	689-690	656-658	670-672	657-661	-	654	656-657	89
88	652	-	704-707	678	684-688	654-655	667-669	653-656	671-672	651-653	653-655	88
87	651	692-694	-	674-677	680-683	653	661-666	652	666-670	650	652	87
86	649-650	690-691	699-703	-	679	651-652	-	651	663-665	-	650-651	86
85	647-648	687-689	696-698	669-673	675-678	647-650	656-660	-	-	644-649	-	85
84	645-646	685-686	695	665-668	672-674	645-646	655	650	658-662	640-643	648-649	84
83	644	678-684	691-694	664	668-671	644	653-654	649	657	636-639	646-647	83
82	643	676-677	688-690	659-663	-	642-643	-	646-648	-	-	-	82
81	640-642	673-675	687	657-658	666-667	638-641	650-652	645	-	634-635	640-645	81
80	638-639	672	683-686	654-656	665	-	647-648	643-644	-	-	637-639	80
79	637	667-671	681-682	650-653	662-664	-	-	641-642	655-656	633	634-636	79
78	636	665-666	679-680	-	661	635-637	-	640	-	631-632	631-633	78
77	635	663-664	675-678	648-649	660	-	-	-	653-654	630	-	77
76	634	660-662	-	646-647	659	632-634	-	-	-	629	629-630	76
75	633	-	-	645	-	630-631	646	637-639	651-652	624-628	628	75
74	631-632	659	672-674	642-644	656-658	629	-	635-636	649-650	623	626-627	74
73	629-630	657-658	-	-	655	628	-	-	647-648	-	625	73
72	-	653-656	668-671	640-641	653-654	627	644-645	633-634	-	621-622	-	72
71	628	652	665-667	638-639	651-652	625-626	-	632	643-646	-	623-624	71
70	627	651	-	633-637	-	-	642-643	630-631	-	620	622	70
69	626	649-650	664	630-632	647-650	624	641	-	-	-	-	69
68	-	648	-	-	646	-	-	628-629	642	619	619-621	68
67	624-625	646-647	-	629	-	623	639-640	626-627	-	618	617-618	67
66	623	645	660-663	627-628	645	622	-	-	640-641	616-617	-	66
65	621-622	644	-	626	643-644	619-621	638	625	639	613-615	615-616	65
64	-	643	-	-	642	618	-	624	637-638	-	614	64
63	620	-	659	622-625	-	-	636-637	623	-	-	-	63
62	617-619	639-642	658	621	641	616-617	-	622	-	611-612	-	62
61	614-616	-	656-657	618-620	639-640	615	635	621	635-636	-	612-613	61
60	-	-	-	-	637-638	-	-	620	632-634	610	611	60
59	611-613	-	655	614-617	-	614	634	-	-	609	-	59
58	610	637-638	653-654	612-613	-	613	632-633	619	-	-	-	58
57	608-609	-	-	609-611	636	612	-	-	631	-	609-610	57
56	605-607	635-636	-	608	-	-	630-631	616-618	629-630	607-608	607-608	56
55	-	634	651-652	607	635	611	-	615	628	606	-	55
54	-	-	-	605-606	632-634	610	629	-	627	-	606	54
53	604	-	649-650	603-604	-	609	-	614	626	605	605	53
52	602-603	633	-	602	-	608	627-628	-	624-625	-	-	52
51	-	630-632	647-648	-	631	607	626	613	623	604	604	51
50	599-601	629	646	601	-	-	-	-	622	601-603	-	50

AGE 14

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	-	-	598-600	630	606	624-625	611-612	620-621	-	600-603	49
48	598	627-628	643-645	-	628-629	604-605	623	610	-	-	-	48
47	596-597	625-626	-	597	-	-	622	609	619	-	598-599	47
46	595	623-624	642	-	625-627	603	-	-	618	599-600	597	46
45	593-594	-	639-641	594-596	623-624	601-602	619-621	-	-	-	595-596	45
44	-	620-622	-	592-593	621-622	600	616-618	607-608	-	598	594	44
43	-	-	638	587-591	-	598-599	-	606	617	-	-	43
42	590-592	619	636-637	-	620	-	-	-	-	-	-	42
41	-	-	635	-	-	597	-	-	615-616	-	-	41
40	-	618	634	-	616-619	595-596	-	604-605	612-614	594-597	591-593	40
39	589	616-617	-	586	610-615	593-594	-	-	-	-	-	39
38	587-588	-	630-633	583-585	609	-	-	603	-	-	-	38
37	586	614-615	628-629	581-582	-	589-592	615	-	-	592-593	588-590	37
36	583-585	-	627	579-580	607-608	-	611-614	601-602	-	591	587	36
35	582	-	624-626	577-578	605-606	-	610	-	-	-	-	35
34	581	610-613	-	-	-	588	-	598-600	611	-	-	34
33	578-580	-	623	-	603-604	585-587	-	-	608-610	-	586	33
32	577	609	620-622	573-576	-	584	-	596-597	606-607	588-590	584-585	32
31	575-576	-	618-619	570-572	-	583	-	594-595	-	586-587	-	31
30	574	604-608	616-617	569	600-602	582	609	593	-	585	583	30
29	-	-	613-615	-	-	580-581	608	-	-	584	-	29
28	571-573	-	-	567-568	598-599	579	604-607	-	-	-	582	28
27	569-570	-	612	565-566	596-597	576-578	-	-	602-605	-	-	27
26	568	600-603	610-611	561-564	-	571-575	-	-	601	581-583	581	26
25	567	599	609	560	591-595	569-570	-	591-592	600	-	578-580	25
24	565-566	598	608	555-559	590	566-568	-	587-590	-	-	-	24
23	562-564	595-597	603-607	552-554	589	-	-	-	-	-	-	23
22	559-561	588-594	602	-	-	564-565	599-603	-	599	577-580	-	22
21	558	585-587	600-601	547-551	587-588	559-563	-	-	595-598	-	575-577	21
20	557	580-584	599	542-546	-	555-558	-	585-588	-	-	-	20
19	555-556	579	598	539-541	583-586	552-554	-	-	591-594	574-576	572-574	19
18	553-554	574-578	594-597	534-538	-	548-551	-	582-584	589-590	-	571	18
17	549-552	-	593	528-533	-	546-547	593-598	581	585-588	-	-	17
16	545-548	569-573	590-592	-	582	544-545	-	-	584	570-573	-	16
15	-	568	587-589	526-527	573-581	537-543	-	580	-	-	568-570	15
14	540-544	564-567	586	523-525	571-572	-	-	577-579	582-583	569	-	14
13	537-539	559-563	583-585	514-522	566-570	534-536	-	-	580-581	567-568	565-567	13
12	532-536	557-558	579-582	513	-	530-533	591-592	-	578-579	-	-	12
11	-	554-556	574-578	507-512	562-565	-	588-590	575-576	577	-	-	11
10	527-531	548-553	571-573	505-506	561	524-529	-	572-574	573-576	564-566	563-564	10
9	519-526	544-547	566-570	501-504	556-560	519-523	585-587	571	-	-	561-562	9
8	511-518	540-543	563-565	495-500	552-555	-	583-584	570	569-572	563	560	8
7	498-510	534-539	553-562	490-494	544-551	515-518	580-582	568-569	568	557-562	558-559	7
6	494-497	527-533	548-552	489	540-543	-	577-579	566-567	-	553-556	557	6
5	490-493	520-526	543-547	484-488	536-539	512-514	572-576	562-565	-	549-552	556	5
4	485-489	519	539-542	483	530-535	504-511	566-571	560-561	566-567	-	554-555	4
3	477-484	508-518	531-538	472-482	517-529	501-503	561-565	559	555-565	542-548	547-553	3
2	473-476	496-507	519-530	466-471	506-516	492-500	556-560	542-558	547-554	537-541	546	2
1	347-472	341-495	363-518	345-465	360-505	360-491	458-555	460-541	458-546	421-536	434-545	1

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Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	712-816	757-822	767-832	757-841	807-830	722-826	752-808	722-795	709-807	704-812	736-809	99
98	706-711	745-756	748-766	739-756	781-806	698-721	716-751	706-721	700-708	694-703	713-735	98
97	701-705	742-744	741-747	732-738	751-780	694-697	706-715	698-705	-	686-693	712	97
96	697-700	736-741	734-740	721-731	738-750	689-693	699-705	696-697	693-699	683-685	700-711	96
95	692-696	728-735	728-733	716-720	725-737	680-688	688-698	694-695	-	679-682	688-699	95
94	686-691	722-727	-	-	715-724	673-679	681-687	688-693	-	677-678	687	94
93	684-685	714-721	722-727	711-715	710-714	671-672	679-680	682-687	686-692	672-676	683-686	93
92	677-683	712-713	-	702-710	706-709	670	-	676-681	-	670-671	678-682	92
91	675-676	708-711	720-721	698-701	705	667-669	674-678	675	-	-	676-677	91
90	673-674	-	717-719	697	-	-	673	674	684-685	669	675	90
89	668-672	-	714-716	688-696	702-704	665-666	667-672	669-673	-	666-668	669-674	89
88	664-667	703-707	713	686-687	697-701	664	-	668	680-683	665	668	88
87	661-663	697-702	708-712	684-685	694-696	660-663	663-666	664-667	-	662-664	666-667	87
86	-	-	704-707	-	692-693	659	661-662	662-663	679	661	660-665	86
85	658-660	692-696	699-703	682-683	690-691	658	-	657-661	674-678	658-660	659	85
84	655-657	690-691	-	679-681	688-689	656-657	-	-	673	656-657	657-658	84
83	-	687-689	698	676-678	684-687	-	-	656	-	653-655	650-656	83
82	-	-	696-697	674-675	-	654-655	-	654-655	-	650-652	647-649	82
81	653-654	683-686	695	-	682-683	651-653	-	652-653	-	649	646	81
80	649-652	-	692-694	-	680-681	649-650	659-660	651	671-672	644-648	644-645	80
79	-	-	-	672-673	-	648	657-658	-	668-670	-	643	79
78	647-648	679-682	691	671	679	645-647	656	649-650	667	641-643	642	78
77	646	677-678	688-690	667-670	677-678	-	-	647-648	665-666	640	640-641	77
76	643-645	676	687	663-666	675-676	643-644	655	646	663-664	639	-	76
75	-	-	-	659-662	673-674	642	653-654	-	-	638	639	75
74	640-642	-	685-686	-	668-672	641	-	645	-	637	637-638	74
73	639	673-675	683-684	-	-	640	-	643-644	-	-	-	73
72	-	672	681-682	658	666-667	639	-	640-642	662	-	636	72
71	637-638	-	-	655-657	-	638	650-652	-	658-661	636	634-635	71
70	635-636	-	679-680	654	663-665	637	-	-	-	634-635	-	70
69	633-634	667-671	-	653	660-662	-	-	-	657	-	-	69
68	-	-	677-678	646-652	659	635-636	648-649	637-639	-	631-633	632-633	68
67	631-632	-	675-676	-	-	-	647	635-636	655-656	-	631	67
66	630	665-666	672-674	644-645	658	-	646	-	653-654	630	627-630	66
65	629	664	-	641-643	656-657	634	644-645	634	-	-	625-626	65
64	626-628	-	670-671	639-640	-	-	-	-	651-652	628-629	624	64
63	625	-	669	637-638	-	632-633	-	633	-	627	-	63
62	623-624	662-663	668	635-636	655	631	-	-	650	625-626	623	62
61	-	658-661	-	633-634	653-654	629-630	-	632	-	624	622	61
60	621-622	657	667	631-632	651-652	-	640-643	630-631	648-649	-	620-621	60
59	620	655-656	665-666	630	-	627-628	639	-	647	623	-	59
58	-	653-654	664	-	-	625-626	-	629	-	620-622	618-619	58
57	617-619	650-652	663	627-629	649-650	-	638	628	-	-	-	57
56	-	-	661-662	626	646-648	623-624	637	-	643-646	619	617	56
55	614-616	649	660	625	-	-	635-636	626-627	642	617-618	616	55
54	-	648	659	622-624	-	619-622	633-634	-	-	-	615	54
53	613	646-647	-	618-621	-	618	-	-	641	-	614	53
52	611-612	-	-	-	642-645	616-617	632	625	640	614-616	-	52
51	609-610	645	658	614-617	-	-	630-631	-	639	-	-	51
50	608	644	656-657	613	-	-	-	-	637-638	-	611-613	50

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AGE 15

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	606-607	641-643	-	611-612	641	615	629	623-624	-	-	-	49
48	605	639-640	654-655	608-610	638-640	-	627-628	622	-	-	-	48
47	-	-	651-653	607	637	-	-	621	636	613	-	47
46	602-604	638	-	605-606	-	614	-	-	-	-	608-610	46
45	-	635-637	649-650	603-604	-	613	626	620	634-635	611-612	-	45
44	599-601	634	-	602	636	612	624-625	619	632-633	-	607	44
43	598	-	648	600-601	-	-	-	-	631	609-610	-	43
42	596-597	-	647	598-599	635	609-611	623	-	-	607-608	605-606	42
41	-	-	646	597	634	608	-	-	-	-	604	41
40	593-595	-	644-645	593-596	-	607	622	617-618	629-630	604-606	602-603	40
39	590-592	633	643	591-592	632-633	605-606	-	615-616	628	603	601	39
38	-	630-632	642	590	631	604	620-621	613-614	627	602	600	38
37	-	-	640-641	587-589	628-630	-	619	-	626	601	598-599	37
36	587-589	629	639	-	627	598-603	-	-	624-625	-	596-597	36
35	-	-	637-638	586	625-626	597	616-618	611-612	623	-	595	35
34	584-586	628	635-636	582-585	-	596	-	-	-	600	594	34
33	581-583	625-627	632-634	581	-	595	-	610	621-622	598-599	-	33
32	577-580	623-624	631	579-580	621-624	593-594	-	609	620	-	-	32
31	574-576	-	629-630	577-578	620	590-592	615	607-608	619	596-597	592-593	31
30	-	620-622	628	575-576	619	588-589	613-614	606	618	-	591	30
29	571-573	619	-	570-574	615-618	584-587	611-612	605	617	-	-	29
28	569-570	616-618	624-627	567-569	612-614	583	610	603-604	-	-	-	28
27	568	614-615	623	565-566	611	577-582	-	-	-	-	-	27
26	-	610-613	620-622	561-564	-	575-576	-	601-602	612-616	595	-	26
25	565-567	-	618-619	-	-	573-574	606-609	-	-	593-594	588-590	25
24	-	609	617	-	610	570-572	604-605	-	606-611	591-592	587	24
23	562-564	606-608	616	-	607-609	568-569	-	-	-	-	586	23
22	561	604-605	614-615	559-560	603-606	564-567	-	598-600	-	-	585	22
21	557-560	600-603	613	557-558	600-602	559-563	-	-	-	588-590	584	21
20	553-556	-	610-612	-	597-599	558	601-603	596-597	604-605	587	582-583	20
19	-	595-599	606-609	556	596	552-557	599-600	594-595	-	-	580-581	19
18	550-552	594	-	555	591-595	551	-	593	601-603	584-586	578-579	18
17	549	590-593	605	-	589-590	546-550	593-598	-	600	583	575-577	17
16	547-548	585-589	603-604	552-554	-	544-545	-	591-592	-	581-582	574	16
15	-	580-584	601-602	547-551	583-588	541-543	-	-	598-599	-	572-573	15
14	545-546	575-579	595-600	544-546	-	538-540	588-592	587-590	596-597	-	571	14
13	541-544	574	594	542-543	578-582	537	-	583-586	595	577-580	569-570	13
12	537-540	569-573	589-593	539-541	572-577	534-536	-	582	-	573-576	566-568	12
11	532-536	564-568	587-588	537-538	570-571	529-533	583-587	581	591-594	569-572	565	11
10	527-531	559-563	582-586	531-536	565-569	526-528	-	577-580	589-590	567-568	561-564	10
9	520-526	557-558	578-581	527-530	560-564	525	582	574-576	585-588	-	-	9
8	506-519	554-556	574-577	519-526	554-559	520-524	-	571-573	584	564-566	560	8
7	496-505	544-553	567-573	513-518	544-553	515-519	577-581	570	579-583	-	558-559	7
6	490-495	543	560-566	507-512	543	512-514	-	566-569	578	561-563	-	6
5	484-489	534-542	553-559	501-506	538-542	504-511	-	562-565	576-577	557-560	556-557	5
4	473-483	530-533	541-552	495-500	529-537	501-503	572-576	560-561	573-575	553-556	555	4
3	468-472	518-529	522-540	489-494	515-528	496-500	567-571	554-559	568-572	549-552	551-554	3
2	464-467	496-517	506-521	477-488	511-514	486-495	561-566	-	562-567	541-548	548-550	2
1	347-463	341-495	363-505	345-476	360-510	369-485	458-560	460-553	458-561	421-540	434-547	1

AGE 16

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	732-816	757-822	784-832	784-841	827-830	734-826	727-808	771-795	739-807	718-812	731-809	99
98	-	-	768-783	749-783	766-826	712-733	716-726	744-770	727-738	701-717	712-730	98
97	717-731	740-756	757-767	739-748	760-765	706-711	707-715	715-743	722-726	699-700	706-711	97
96	703-716	734-739	741-756	733-738	745-759	696-705	-	705-714	708-721	691-698	696-705	96
95	701-702	728-733	-	-	-	687-695	692-706	696-704	702-707	687-690	688-695	95
94	692-700	721-727	734-740	727-732	725-744	683-686	685-691	689-695	700-701	685-686	683-687	94
93	687-691	-	-	-	720-724	680-682	-	682-688	693-699	683-684	680-682	93
92	684-686	-	-	725-726	719	674-679	-	681	-	677-682	677-679	92
91	681-683	714-720	728-733	721-724	714-718	673	682-684	674-680	686-692	676	673-676	91
90	680	-	-	712-720	713	671-672	681	-	-	670-675	672	90
89	676-679	708-713	722-727	711	710-712	668-670	679-680	669-673	-	669	669-671	89
88	674-675	-	717-721	-	706-709	667	674-678	-	-	668	668	88
87	670-673	703-707	-	707-710	705	665-666	-	668	684-685	666-667	665-667	87
86	668-669	-	713-716	702-706	701-704	-	-	663-667	680-683	-	662-664	86
85	667	702	712	698-701	700	-	673	-	679	663-665	661	85
84	665-666	697-701	708-711	-	696-699	659-664	671-672	662	-	661-662	657-660	84
83	662-664	-	-	695-697	694-695	656-658	666-670	-	673-678	657-660	-	83
82	-	696	704-707	693-694	690-693	-	662-665	-	-	-	656	82
81	659-661	692-695	-	688-692	689	655	661	657-661	-	656	654-655	81
80	655-658	691	700-703	684-687	687-688	653-654	-	-	-	653-655	653	80
79	-	687-690	698-699	-	686	652	-	-	669-672	-	652	79
78	652-654	-	696-697	682-683	684-685	650-651	656-660	656	668	651-652	-	78
77	-	-	-	-	683	647-649	655	-	667	650	651	77
76	651	683-686	693-695	679-681	-	645-646	653-654	-	665-666	647-649	650	76
75	647-650	-	692	-	-	-	-	654-655	-	644-646	647-649	75
74	646	682	-	675-678	680-682	643-644	650-652	651-653	664	-	643-646	74
73	645	678-681	691	674	677-679	642	-	650	663	-	-	73
72	643-644	-	688-690	-	-	-	-	647-649	-	641-643	641-642	72
71	-	677	-	-	675-676	640-641	-	646	662	640	640	71
70	640-642	676	-	671-673	672-674	638-639	-	641-645	-	-	639	70
69	-	-	687	667-670	670-671	-	649	640	-	639	-	69
68	639	673-675	685-686	663-666	668-669	635-637	647-648	-	658-661	637-638	637-638	68
67	637-638	672	-	662	-	-	646	-	-	-	634-636	67
66	636	-	684	659-661	665-667	-	644-645	635-639	657	-	-	66
65	635	669-671	683	657-658	664	633-634	-	-	655-656	634-636	-	65
64	-	667-668	681-682	653-656	662-663	632	-	634	-	-	-	64
63	634	664-666	-	651-652	660-661	631	641-643	633	651-654	633	633	63
62	631-633	663	680	650	-	-	639-640	632	-	631-632	-	62
61	629-630	662	679	649	659	629-630	-	630-631	-	-	631-632	61
60	628	660-661	676-678	648	658	628	-	-	650	-	629-630	60
59	625-627	-	675	646-647	656-657	-	-	629	647-649	630	628	59
58	623-624	656-659	-	645	-	627	638	626-628	-	-	-	58
57	620-622	655	674	644	655	626	-	-	-	628-629	-	57
56	-	-	-	641-643	653-654	-	636-637	625	-	627	627	56
55	617-619	653-654	672-673	640	-	625	-	624	643-646	626	626	55
54	-	652	671	-	-	623-624	634-635	-	641-642	-	-	54
53	616	651	670	638-639	652	621-622	633	-	640	624-625	624-625	53
52	614-615	650	-	-	651	-	-	621-623	638-639	-	-	52
51	-	-	668-669	637	-	618-620	-	620	637	-	-	51
50	612-613	649	-	634-636	650	-	-	-	-	623	623	50

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AGE 16

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	611	-	665-667	632-633	649	617	632	619	-	621-622	-	49
48	609-610	648	664	629-631	646-648	616	-	618	636	-	620-622	48
47	608	-	-	627-628	-	615	630-631	617	634-635	619-620	617-619	47
46	606-607	645-647	663	626	643-645	-	629	-	632-633	617-618	616	46
45	605	644	662	625	642	612-614	-	615-616	631	616	615	45
44	-	-	660-661	622-624	639-641	611	-	614	-	614-615	-	44
43	602-604	643	659	619-621	637-638	609-610	627-628	-	-	-	614	43
42	600-601	-	658	616-618	-	608	625-626	613	-	613	612-613	42
41	599	640-642	656-657	611-615	636	-	623-624	612	-	610-612	611	41
40	596-598	639	655	609-610	635	607	622	611	628-630	609	-	40
39	-	638	653-654	607-608	631-634	-	-	610	-	608	607-610	39
38	593-595	637	650-652	605-606	-	604-606	-	-	626-627	607	-	38
37	-	635-636	648-649	602-604	629-630	603	620-621	608-609	625	606	605-606	37
36	590-592	634	646-647	-	626-628	-	-	607	624	605	602-604	36
35	-	-	644-645	601	625	602	619	606	623	604	600-601	35
34	587-589	633	642-643	599-600	623-624	598-601	616-618	605	-	-	598-599	34
33	586	-	-	598	621-622	596-597	-	604	621-622	601-603	596-597	33
32	584-585	630-632	639-641	596-597	620	-	-	-	620	-	595	32
31	-	629	638	593-595	-	595	-	603	618-619	599-600	-	31
30	582-583	-	636-637	587-592	617-619	593-594	-	601-602	617	598	594	30
29	581	628	-	-	616	591-592	615	-	-	594-597	591-593	29
28	578-580	625-627	635	584-586	615	590	611-614	599-600	612-616	592-593	589-590	28
27	-	623-624	632-634	581-583	611-614	588-589	610	598	-	591	588	27
26	577	-	631	577-580	-	587	-	596-597	-	-	586-587	26
25	574-576	620-622	629-630	575-576	-	585-586	-	-	611	-	585	25
24	571-573	619	628	570-574	609-610	582-584	609	594-595	606-610	-	584	24
23	568-570	618	-	569	605-608	579-581	604-608	593	-	-	-	23
22	565-567	616-617	625-627	567-568	-	576-578	-	-	601-605	588-590	583	22
21	-	614-615	622-624	565-566	603-604	570-575	-	-	600	-	581-582	21
20	562-564	611-613	620-621	564	600-602	569	-	-	-	-	-	20
19	-	609-610	618-619	561-563	596-599	566-568	599-603	591-592	596-599	584-587	578-580	19
18	560-561	605-608	617	557-560	-	564-565	-	-	-	-	-	18
17	558-559	604	613-616	552-556	-	559-563	-	587-590	595	-	-	17
16	557	-	612	549-551	591-595	555-558	598	-	590-594	581-583	575-577	16
15	555-556	600-603	606-611	544-548	590	551-554	593-597	585-586	589	-	574	15
14	553-554	599	602-605	542-543	589	548-550	-	583-584	-	575-580	-	14
13	-	595-598	598-601	538-541	585-588	544-547	-	582	584-588	574	-	13
12	549-552	590-594	595-597	534-537	583-584	-	591-592	581	-	-	571-573	12
11	545-548	580-589	593-594	531-533	578-582	541-543	588-590	577-580	-	-	-	11
10	541-544	575-579	587-592	526-530	577	534-540	-	-	-	571-573	-	10
9	537-540	569-574	583-586	523-525	562-576	-	585-587	575-576	579-583	570	570	9
8	532-536	565-568	579-582	519-522	-	530-533	583-584	571-574	574-578	-	568-569	8
7	527-531	564	573-578	518	557-561	526-529	582	568-570	573	567-569	-	7
6	511-526	554-563	569-572	513-517	552-556	523-525	577-581	566-567	568-572	564-566	565-567	6
5	499-510	548-553	564-568	507-512	546-551	516-522	569-576	-	564-567	557-563	561-564	5
4	490-498	534-547	556-563	496-506	538-545	504-515	567-568	-	562-563	556	558-560	4
3	478-489	529-533	548-555	489-495	530-537	498-503	-	558-565	-	553-555	554-557	3
2	468-477	516-528	533-547	478-488	520-529	493-497	561-566	554-557	557-561	544-552	547-553	2
1	347-467	341-515	363-532	345-477	360-519	369-492	458-560	460-553	458-556	421-543	434-546	1

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AGE 17

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	741-816	773-822	832	776-841	830	721-826	716-808	733-795	727-807	715-812	739-809	99
98	712-740	757-772	784-831	764-775	782-829	703-720	-	709-732	716-726	704-714	727-738	98
97	706-711	745-756	768-783	-	766-781	692-702	707-715	705-708	-	698-703	712-726	97
96	697-705	737-744	759-767	748-763	755-765	690-691	699-706	696-704	710-715	695-697	707-711	96
95	692-696	728-736	757-758	733-747	745-754	688-689	692-698	695	705-709	691-694	706	95
94	688-691	-	748-756	-	731-744	684-687	-	688-694	700-704	683-690	701-705	94
93	684-687	725-727	741-747	727-732	727-730	681-683	687-691	-	-	681-682	695-700	93
92	681-683	721-724	-	722-726	719-726	677-680	685-686	681-687	693-699	-	687-694	92
91	680	714-720	734-740	721	714-718	674-676	682-684	675-680	-	679-680	-	91
90	678-679	-	728-733	716-720	710-713	671-673	681	674	-	676-678	680-686	90
89	677	-	723-727	711-715	708-709	670	-	-	-	-	676-679	89
88	674-676	711-713	722	710	701-707	669	679-680	-	686-692	672-675	-	88
87	-	708-710	-	702-709	-	667-668	-	669-673	685	-	-	87
86	673	-	718-721	698-701	697-700	-	674-678	-	680-684	669-671	672-675	86
85	670-672	-	717	-	696	665-666	673	668	-	-	-	85
84	667-669	703-707	-	696-697	695	-	672	-	-	667-668	665-671	84
83	662-666	-	714-716	694-695	693-694	-	667-671	663-667	674-679	666	662-664	83
82	661	697-702	713	-	-	662-664	-	-	-	662-665	-	82
81	658-660	626	711-712	691-693	692	659-661	-	-	673	-	660-661	81
80	-	692-695	709-710	688-690	691	-	666	-	-	660-661	659	80
79	656-657	-	-	686-687	690	-	663-665	662	-	657-659	658	79
78	655	688-691	708	684-685	689	656-658	661-662	657-661	671-672	654-656	656-657	78
77	652-654	687	-	679-683	688	655	-	656	669-670	653	653-655	77
76	-	-	704-707	-	686-687	653-654	-	655	667-668	650-652	651-652	76
75	649-651	686	-	675-678	684-685	-	659-660	652-654	-	648-649	650	75
74	647-648	-	-	674	683	651-652	656-658	651	-	647	649	74
73	646	683-685	-	-	682	649-650	-	-	665-666	-	647-648	73
72	-	-	700-703	671-673	-	648	-	-	-	645-646	-	72
71	644-645	-	699	668-670	680-681	-	-	647-650	664	644	644-646	71
70	643	681-682	696-698	667	-	647	655	646	663	641-643	643	70
69	-	678-680	-	666	679	645-646	653-654	-	-	638-640	-	69
68	641-642	676-677	695	664-665	677-678	-	-	645	-	-	-	68
67	640	-	692-694	663	676	642-644	-	-	661-662	637	641-642	67
66	639	-	691	662	673-675	641	-	643-644	658-660	-	-	66
65	637-638	673-675	688-690	659-661	668-672	639-640	-	641-642	657	-	640	65
64	-	672	-	657-658	-	-	-	640	-	-	-	64
63	636	-	685-687	655-656	667	638	650-652	-	-	634-636	637-639	63
62	-	-	683-684	654	665-666	-	-	-	655-656	-	-	62
61	635	669-671	-	653	-	637	-	-	653-654	-	-	61
60	634	667-668	681-682	652	-	636	-	-	651-652	-	635-636	60
59	-	-	-	651	663-664	635	647-649	638-639	-	-	632-634	59
58	632-633	-	679-680	650	662	633-634	646	635-637	-	632-633	631	58
57	630-631	664-666	-	-	661	-	645	-	-	631	630	57
56	629	-	677-678	647-649	-	632	644	634	650	-	-	56
55	627-628	662-663	675-676	646	660	-	-	631-633	-	-	628-629	55
54	625-626	-	674	-	659	631	-	630	648-649	-	627	54
53	623-624	660-661	673	645	657-658	629-630	641-643	628-629	647	630	-	53
52	622	658-659	671-672	644	656	628	639-640	626-627	-	-	-	52
51	620-621	-	670	642-643	653-655	626-627	638	625	-	627-629	626	51
50	618-619	657	669	640-641	652	-	-	-	-	626	623-625	50

AGE 17

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	617	655-656	668	-	651	625	636-637	-	646	-	622	49
48	615-616	-	-	635-639	-	-	-	624	643-645	-	621	48
47	614	653-654	667	634	-	623-624	633-635	622-623	-	624-625	620	47
46	612-613	-	665-666	632-633	-	-	-	-	642	-	618-619	46
45	611	652	-	630-631	647-650	621-622	-	621	-	622-623	-	45
44	-	651	-	627-629	646	-	632	-	640-641	620-621	-	44
43	610	649-650	664	625-626	643-645	619-620	630-631	620	639	-	617	43
42	609	648	663	622-624	-	-	-	-	637-638	618-619	-	42
41	608	645-647	661-662	621	640-642	617-618	629	619	-	617	-	41
40	605-607	-	659-660	618-620	639	-	-	618	636	616	615-616	40
39	603-604	644	656-658	-	-	615-616	-	617	634-635	614-615	614	39
38	602	-	-	-	637-638	-	627-628	-	632-633	613	-	38
37	599-601	643	654-655	614-617	-	614	626	614-616	631	-	611-613	37
36	-	642	-	613	-	612-613	624-625	-	-	-	609-610	36
35	596-598	639-641	653	609-612	636	611	-	613	-	611-612	607-608	35
34	595	-	651-652	608	632-635	609-610	623	-	626-630	-	605-606	34
33	591-594	-		606-607	631	-	-	611-612	624-625	609-610	-	33
32	587-590	637-638	649-650	605	630	607-608	620-622	610	623	607-608	604	32
31	586	635-636	648	602-604	627-629	604-606	-	609	622	606	-	31
30	584-585	634	-	-	625-626	-	616-619	-	621	604-605	603	30
29	581-583	-	646-647	599-601	623-624	603	-	-	618-620	603	600-602	29
28	-	633	-	595-598	622	601-602	-	607-608	-	-	-	28
27	578-580	630-632	643-645	591-594	621	600	615	606	-	-	598-599	27
26	577	629	641-642	590	620	598-599	613-614	-	617	601-602	597	26
25	575-576	-	640	587-589	-	596-597	610-612	604-605	616	598-600	-	25
24	574	625-628	639	586	-	-	-	-	612-615	-	595-596	24
23	571-573	623-624	-	585	619	593-595	-	603	-	-	594	23
22	568-570	-	636-638	579-584	615-618	591-592	-	601-602	611	595-597	-	22
21	566-567	-	635	577-578	613-614	588-590	605-609	600	610	593-594	593	21
20	565	620-622	-	573-576	611-612	585-587	604	599	606-609	592	591-592	20
19	-	619	-	-	610	582-584	-	596-598	-	591	-	19
18	562-564	616-618	631-634	569-572	605-609	580-581	-	595	-	-	-	18
17	-	614-615	628-630	567-568	603-604	576-579	-	593-594	605	589-590	588-590	17
16	558-561	609-613	625-627	565-566	-	574-575	599-603	-	601-604	587-588	587	16
15	555-557	606-608	624	561-564	600-602	570-573	-	-	600	585-586	585-586	15
14	553-554	604-605	621-623	552-560	596-599	569	594-598	592	595-599	-	584	14
13	-	603	620	550-551	595	565-568	593	587-591	-	582-584	-	13
12	549-552	598-602	617-619	544-549	591-594	559-564	-	-	589-594	581	582-583	12
11	545-548	595-567	616	541-543	588-590	550-558	-	-	-	574-580	581	11
10	541-544	590-594	612-615	534-540	580-587	548-549	588-592	582-586	-	-	578-580	10
9	537-540	580-589	606-611	528-533	576-579	543-547	583-587	-	584-588	570-573	574-577	9
8	529-536	574-579	600-605	522-527	568-575	539-542	-	581	-	569	571-573	8
7	524-528	569-573	591-599	507-521	562-567	534-538	-	577-580	581-583	567-568	568-570	7
6	507-523	557-568	586-590	-	557-561	531-533	577-582	571-576	574-580	566	-	6
5	493-506	544-556	578-585	499-506	543-556	524-530	572-576	570	568-573	564-565	565-567	5
4	482-492	531-543	561-577	489-498	540-542	515-523	-	566-569	562-567	557-563	561-564	4
3	473-481	521-530	555-560	482-488	529-539	508-514	568-571	560-565	-	553-556	-	3
2	467-472	499-520	552-554	469-481	522-528	498-507	561-567	554-559	557-561	547-552	559-560	2
1	347-466	341-498	363-551	345-468	360-521	369-497	458-560	460-553	458-556	421-546	434-558	1

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AGE 18

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	706-816	736-822	768-832	746-841	807-830	711-826	728-808	728-795	734-807	696-812	716-809	99
98	693-705	730-735	757-767	737-745	742-806	694-710	699-727	701-727	727-733	691-695	701-715	98
97	688-692	728-729	748-756	724-736	720-741	687-693	696-698	696-700	716-726	679-690	697-700	97
96	681-687	721-727	741-747	714-723	717-719	680-686	691-695	683-695	711-715	671-678	691-696	96
95	679-680	-	-	707-713	714-716	675-679	682-690	681-682	708-710	666-670	678-690	95
94	677-678	714-720	734-740	702-706	711-713	673-674	679-681	-	693-707	663-665	672-677	94
93	674-676	-	-	698-701	710	668-672	674-678	675-680	-	661-662	-	93
92	670-673	-	728-733	-	706-709	665-667	-	670-674	-	657-660	665-671	92
91	667-669	709-713	722-727	693-697	702-705	659-664	673	663-669	680-692	656	664	91
90	663-666	703-708	-	692	701	657-658	671-672	-	679	654-655	660-663	90
89	658-662	-	718-721	688-691	700	655-656	667-670	662	677-678	-	-	89
88	655-657	702	717	-	696-699	653-654	666	-	674-676	651-653	657-659	88
87	-	699-701	713-716	685-687	695	651-652	663-665	657-661	673	650	655-656	87
86	-	697-698	-	682-684	692-694	650	661-662	-	-	649	654	86
85	652-654	-	-	679-681	691	649	-	656	668-672	-	653	85
84	649-651	692-696	710-712	-	689-690	648	-	655	664-667	648	650-652	84
83	-	691	708-709	675-678	-	-	659-660	651-654	-	647	647-649	83
82	646-648	687-690	704-707	672-674	688	645-647	656-658	-	662-663	646	645-646	82
81	645	-	-	671	686-687	-	655	649-650	-	-	643-644	81
80	643-644	683-686	700-703	670	685	642-644	-	646-648	-	644-645	642	80
79	-	-	-	-	683-684	-	-	645	658-661	-	640-641	79
78	-	-	698-699	667-669	680-682	641	653-654	643-644	-	643	638-639	78
77	641-642	681-682	696-697	-	679	640	-	641-642	-	641-642	636-637	77
76	640	678-680	-	666	676-678	-	-	640	657	640	634-635	76
75	639	-	693-695	664-665	675	639	650-652	-	-	637-639	-	75
74	-	677	692	663	673-674	638	-	-	-	-	-	74
73	636-638	676	-	662	672	-	-	-	-	634-636	-	73
72	635	-	690-691	659-661	670-671	637	-	637-639	656	-	-	72
71	633-634	673-675	688-689	-	-	635-636	647-649	-	655	-	631-633	71
70	631-632	-	685-687	655-658	668-669	-	-	635-636	-	633	-	70
69	629-630	-	-	654	-	634	646	634	652-654	-	-	69
68	-	672	684	652-653	666-667	633	-	633	651	631-632	-	68
67	627-628	670-671	681-683	-	665	632	644-645	632	650	-	628-630	67
66	623-626	669	-	650-651	-	631	-	630-631	-	-	-	66
65	-	667-668	680	648-649	664	-	-	-	648-649	-	-	65
64	-	665-666	679	646-647	663	630	-	-	647	630	627	64
63	621-622	664	677-678	645	-	-	-	-	-	628-629	626	63
62	-	-	675-676	642-644	662	629	-	-	646	627	624-625	62
61	620	663	-	641	660-661	-	639-643	626-629	643-645	626	-	61
60	618-619	-	674	640	-	628	-	-	641-642	624-625	-	60
59	617	660-662	671-673	638-639	659	627	-	625	640	623	623	59
58	615-616	-	669-670	635-637	656-658	626	638	624	-	621-622	-	58
57	614	-	668	-	655	623-625	-	-	639	-	622	57
56	-	658-659	-	-	-	622	-	-	637-638	-	-	56
55	-	657	667	633-634	653-654	621	636-637	622-623	-	620	621	55
54	612-613	655-656	665-666	631-632	652	620	635	-	636	619	620	54
53	611	653-654	-	628-630	651	-	633-634	620-621	-	617-618	-	53
52	609-610	-	664	626-627	-	618-619	-	-	635	-	618-619	52
51	608	-	-	622-625	-	616-617	-	619	634	616	-	51
50	606-607	650-652	663	618-621	649-650	615	632	-	632-633	614-615	617	50

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AGE 18

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	605	649	660-662	-	-	-	630-631	-	-	-	615-616	49
48	-	-	659	-	644-648	614	-	617-618	-	613	-	48
47	602-604	-	656-658	616-617	643	613	629	-	631	-	-	47
46	-	648	-	614-615	-	612	628	-	-	611-612	614	46
45	599-601	644-647	-	611-613	-	611	626-627	615-616	-	-	-	45
44	-	-	655	610	642	-	-	614	628-630	609-610	-	44
43	597-598	643	654	608-609	641	609-610	624-625	-	-	-	611-613	43
42	596	642	652-653	-	-	608	-	-	627	608	610	42
41	593-595	640-641	651	607	639-640	607	622-623	613	-	607	608-609	41
40	590-592	639	649-650	605-606	637-638	-	-	-	624-626	-	-	40
39	-	-	648	604	-	606	620-621	611-612	-	605-606	607	39
38	587-589	637-638	647	601-603	636	604-605	619	-	-	604	-	38
37	586	636	-	599-600	631-635	601-603	616-618	610	623	603	604-606	37
36	584-585	635	646	598	629-630	600	-	609	622	602	603	36
35	583	634	644-645	597	628	598-599	-	-	620-621	601	601-602	35
34	581-582	631-633	643	595-596	-	-	-	-	618-619	599-600	-	34
33	-	630	-	-	625-627	-	-	607-608	-	-	-	33
32	578-580	629	642	594	-	596-597	615	-	617	598	600	32
31	577	625-628	640-641	591-593	623-624	593-595	-	-	615-616	-	597-599	31
30	-	-	639	586-590	621-622	-	-	606	-	596-597	-	30
29	574-576	623-624	638	582-585	-	590-592	610-614	-	612-614	594-595	595-596	29
28	-	-	636-637	581	620	-	-	604-605	-	-	594	28
27	571-573	620-622	-	579-580	615-619	588-589	-	-	-	-	-	27
26	-	-	635	577-578	-	585-587	-	603	-	582-583	-	26
25	569-570	619	632-634	-	-	584	609	602	610-611	591	591-593	25
24	568	618	629-631	574-576	-	582-583	608	601	606-609	587-590	-	24
23	565-567	616-617	628	573	-	575-581	604-607	-	-	585-586	590	23
22	-	614-615	627	569-572	-	570-574	-	599-600	-	584	588-589	22
21	-	-	624-626	565-568	611-614	-	-	598	602-605	583	585-587	21
20	562-564	609-613	621-623	-	610	569	-	-	601	581-582	-	20
19	558-561	605-608	620	561-564	609	566-568	603	596-597	600	-	584	19
18	557	604	-	556-560	605-608	562-565	599-602	594-595	596-599	-	-	18
17	553-556	603	617-619	552-555	603-604	559-561	-	593	595	-	582-583	17
16	551-552	-	616	547-551	-	554-558	-	-	-	577-580	581	16
15	548-550	595-602	613-615	544-546	600-602	548-553	-	587-592	-	-	578-580	15
14	545-547	-	610-612	539-543	596-599	544-547	593-598	-	-	-	-	14
13	-	587-594	609	537-538	-	541-543	-	-	593-594	-	575-577	13
12	541-544	585-586	606-608	534-536	-	-	-	586	589-592	573-576	574	12
11	-	577-584	605	530-533	589-595	534-540	588-592	585	-	570-572	-	11
10	537-540	574-576	602-604	526-529	587-588	-	-	582-584	584-588	567-569	571-573	10
9	-	569-573	598-601	522-525	583-586	526-533	-	581	-	564-566	568-570	9
8	520-536	563-568	590-597	513-521	572-582	524-525	583-587	580	-	560-563	565-567	8
7	506-519	552-562	586-589	507-512	561-571	519-523	579-582	579	578-583	-	-	7
6	498-505	543-551	578-585	501-506	555-560	514-518	575-578	577-578	576-577	-	561-564	6
5	494-497	533-542	564-577	-	545-554	508-513	572-574	574-576	573-575	557-559	560	5
4	490-493	515-532	553-563	495-500	533-544	497-507	-	571-573	-	553-556	558-559	4
3	483-489	494-514	537-552	478-494	523-532	490-496	567-571	568-570	-	551-552	554-557	3
2	464-482	486-493	529-536	474-477	516-522	482-489	559-566	566-567	557-572	549-550	548-553	2
1	347-463	341-485	363-528	345-473	360-515	369-481	458-558	460-565	458-556	421-548	434-547	1

AGES 19 & 20

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	683-816	739-822	784-832	749-841	738-830	686-826	694-808	691-795				99
98	677-682	736-738	774-783	727-748	731-737	673-685	685-693	675-690				98
97	-	728-735	757-773	720-726	719-730	668-672	-	674				97
96	667-676	-	748-756	716-719	713-718	664-667	681-684	669-673				96
95	662-666	722-727	741-747	-	708-712	662-663	-	663-668				95
94	659-661	718-721	734-740	707-715	704-707	661	679-680	662				94
93	-	715-717	-	704-706	701-703	659-660	672-678	-				93
92	658	714	728-733	703	-	656-658	667-671	657-661				92
91	654-657	708-713	722-727	702	-	-	-	-	I	I	I	91
90	649-653	-	717-721	700-701	700	653-655	-	656				90
89	-	703-707	-	694-699	697-699	-	665-666	654-655	N	N	N	89
88	-	-	713-716	689-693	696	652	661-664	652-653				88
87	646-648	697-702	-	680-688	692-695	651	-	651	S	S	S	87
86	643-645	-	712	679	688-691	-	-	649-650				86
85	-	-	709-711	678	687	648-650	659-660	-	U	U	U	85
84	641-642	692-696	708	675-677	-	-	656-658	647-648				84
83	639-640	-	704-707	-	684-686	-	-	646	F	F	F	83
82	637-638	691	700-703	674	-	645-647	655	-				82
81	636	689-690	-	671-673	681-683	-	653-654	-	F	F	F	81
80	635	686-688	699	670	679-680	644	-	645				80
79	634	683-685	698	666-669	677-678	641-643	-	-	I	I	I	79
78	631-633	-	696-697	662-665	-	640	650-652	-				78
77	630	-	693-695	-	-	639	-	642-644	C	C	C	77
76	628-629	678-682	688-692	659-661	676	638	-	641				76
75	627	-	-	655-658	675	-	648-649	640	I	I	I	75
74	625-626	-	-	653-654	-	637	647	-				74
73	624	676-677	-	651-652	673-674	635-636	644-646	-	E	E	E	73
72	623	673-675	687	649-650	-	-	-	638-639				72
71	621-622	-	-	648	672	634	-	635-637	N	N	N	71
70	620	-	685-686	646-647	670-671	633	-	634				70
69	618-619	672	684	645	-	632	642-643	633	T	T	T	69
68	617	-	683	642-644	-	-	641	632				68
67	-	669-671	680-682	641	668-669	630-631	-	630-631				67
66	616	667-668	-	638-640	666-667	629	640	-				66
65	615	664-666	679	637	665	627-628	639	628-629	D	D	D	65
64	-	-	677-678	634-636	664	626	-	626-627				64
63	614	663	-	631-633	663	624-625	-	625	A	A	A	63
62	612-613	662	675-676	629-630	660-662	-	638	-				62
61	611	660-661	674	626-628	659	623	-	624	T	T	T	61
60	608-610	-	-	-	-	-	636-637	622-623				60
59	605-607	658-659	672-673	622-625	-	621-622	635	621	A	A	A	59
58	602-604	-	-	621	658	620	-	619-620				58
57	-	654-657	671	618-620	656-657	619	634	-				57
56	-	653	670	614-617	653-655	-	633	618				56
55	599-601	651-652	668-669	613	651-652	-	-	615-617				55
54	-	650	666-667	611-612	648-650	616-618	630-632	-				54
53	-	648-649	665	610	646-647	614-615	-	614				53
52	-	645-647	663-664	609	645	611-613	629	613				52
51	596-598	-	660-662	608	643-644	-	628	-				51
50	-	644	-	-	642	609-610	627	-				50

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AGES 19 & 20 (con't) AGES 19 & 20 AGES 19 & 20 (con't)

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

All levels of hearing loss

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	595	-	-	605-607	641	608	626	-				49
48	593-594	643	-	603-604	640	605-607	624-625	612				48
47	-	641-642	-	602	-	-	-	611				47
46	-	639-640	657-659	601	637-639	604	623	610				46
45	591-592	635-638	656	598-600	-	601-603	-	609				45
44	590	634	655	595-597	636	-	622	608				44
43	588-589	-	654	-	632-635	598-600	-	607				43
42	587	633	653	594	-	596-597	-	-				42
41	584-586	630-632	651-652	591-593	-	593-595	-	606	I	I	I	41
40	583	629	649-650	587-590	631	-	-	-				40
39	581-582	-	647-648	586	629-630	-	-	602-605	N	N	N	39
38	-	628	643-646	583-585	628	592	620-621	601				38
37	-	625-627	-	581-582	626-627	590-591	616-619	-	S	S	S	37
36	578-580	623-624	642	578-580	625	588-589	-	600				36
35	577	-	-	573-577	-	585-587	-	599	U	U	U	35
34	575-576	620-622	640-641	-	623-624	584	-	598				34
33	574	-	-	571-572	621-622	580-583	614-615	596-597	F	F	F	33
32	573	-	638-639	569-570	620	579	613	595				32
31	571-572	619	636-637	567-568	-	578	610-612	594	F	F	F	31
30	568-570	616-618	635	566	615-619	576-577	-	592-593				30
29	-	614-615	632-634	565	-	575	-	591	I	I	I	29
28	565-567	610-613	631	562-564	611-614	572-574	-	-				28
27	-	-	629-630	-	610	571	-	-	C	C	C	27
26	562-564	609	628	561	-	569-570	604-609	-				26
25	-	605-608	627	558-560	605-609	566-568	-	587-590	I	I	I	25
24	-	604	625-626	556-557	603-604	564-565	-	-				24
23	561	603	624	555	600-602	562-563	-	586	E	E	E	23
22	558-560	600-602	621-623	552-554	596-599	559-561	-	583-585				22
21	557	-	-	544-551	590-595	555-558	-	582	N	N	N	21
20	553-556	598-599	617-620	540-543	587-589	554	599-603	-				20
19	-	-	616	539	583-586	551-553	598	-	T	T	T	19
18	550-552	595-597	613-615	534-538	582	548-550	593-597	-				18
17	549	590-594	609-612	533	577-581	547	591-592	-				17
16	547-548	-	-	530-532	-	544-546	588-590	581				16
15	545-546	585-589	607-608	526-529	571-576	541-543	-	580	D	D	D	15
14	541-544	584	602-606	524-525	566-570	539-540	-	577-579				14
13	-	579-583	598-601	523	-	534-538	-	-	A	A	A	13
12	-	573-578	593-597	-	563-565	-	-	574-576				12
11	537-540	569-572	590-592	517-522	562	530-533	583-587	571-573	T	T	T	11
10	528-536	-	587-589	513-516	561	526-529	579-582	-				10
9	520-527	-	584-586	507-512	560	523-525	577-578	-	A	A	A	9
8	502-519	564-568	580-583	501-506	552-559	516-522	576	570				8
7	497-501	556-563	573-579	-	549-551	515	572-575	568-569				7
6	490-496	552-555	567-572	495-500	543-548	509-514	571	566-567				6
5	485-489	548-551	563-566	485-494	536-542	500-508	567-570	561-565				5
4	481-484	537-547	556-562	478-484	531-535	493-499	565-566	550-560				4
3	477-480	531-536	539-555	472-477	523-530	490-492	561-564	548-549				3
2	467-476	500-530	529-538	460-471	508-522	482-489	557-560	537-547				2
1	347-466	341-499	363-528	345-459	360-507	369-481	458-556	460-536				1

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Age-based Percentile Ranks
for
Hearing Impaired Students

Severe-profound loss only

AGE 8

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	626-816	639-822	626-832	620-841	654-830	641-826						99
98	618-625	610-638	614-625	611-619	639-653	629-640						98
97	606-617	605-609	612-613	596-610	620-638	616-628						97
96	599-605	589-604	-	580-595	607-619	606-615						96
95	593-598	584-588	-	579	603-606	604						95
94	584-592	580-583	603-611	-	598-602	594-603						94
93	578-583	574-579	602	576-578	-	589-593						93
92	576-577	571-573	595-601	573-575	589-596	581-588						92
91	569-575	566-570	588-594	-	-	574-580	I	I	I	I	I	91
90	566-568	565	586-587	567-572	583-588	-						90
89	565	561-564	576-585	565-566	577-582	570-573	N	N	N	N	N	89
88	561-564	560	574-575	561-564	-	-						88
87	557-560	-	-	557-560	-	569	S	S	S	S	S	87
86	556	-	568-573	555-556	573-576	565-568						86
85	553-555	555-559	564-567	-	568-572	562-564	U	U	U	U	U	85
84	550-552	554	563	550-554	566-567	561						84
83	549	-	-	-	563-565	559-560	F	F	F	F	F	83
82	544-548	549-553	-	544-549	562	552-558						82
81	541-543	-	557-562	541-543	-	-	F	F	F	F	F	81
80	540	548	-	539-540	-	548-551						80
79	537-539	544-547	-	537-538	558-561	-	I	I	I	I	I	79
78	535-536	541-543	552-556	533-536	555-557	544-547						78
77	534	540	-	-	552-554	-	C	C	C	C	C	77
76	532-533	539	-	528-532	-	543						76
75	529-531	-	-	-	-	537-542	I	I	I	I	I	75
74	526-528	-	-	526-527	-	534-536						74
73	517-525	-	-	-	-	-	E	E	E	E	E	73
72	515-516	-	550-551	524-525	550-551	-						72
71	511-514	534-538	547-549	519-523	546-549	530-533	N	N	N	N	N	71
70	502-510	-	-	-	543-545	526-529						70
69	499-501	-	-	-	-	-	T	T	T	T	T	69
68	498	-	-	513-518	-	523-525						68
67	-	533	543-546	-	-	-						67
66	494-497	529-532	542	-	541-542	-						66
65	-	-	-	511-512	536-540	-	D	D	D	D	D	65
64	491-493	-	-	507-510	-	519-522						64
63	490	528	-	-	-	-	A	A	A	A	A	63
62	-	525-527	-	-	-	-						62
61	489	-	537-541	-	-	-	T	T	T	T	T	61
60	485-488	522-524	-	501-506	529-535	515-518						60
59	-	-	-	-	-	-	A	A	A	A	A	59
58	-	520-521	533-536	-	-	-						58
57	-	519	-	-	-	-						57
56	481-484	516-518	-	-	527-528	514						56
55	-	-	532	500	523-526	512-513						55
54	-	-	527-531	495-499	-	-						54
53	477-480	515	526	-	-	-						53
52	-	511-514	525	-	520-522	-						52
51	-	-	-	-	517-519	-						51
50	-	-	522-524	-	-	-						50

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AGE 8

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	509-510	-	489-494	-	508-511						49
48	-	-	521	-	-	-						48
47	473-476	-	518-520	-	-	-						47
46	-	506-508	-	-	516	-						46
45	-	-	517	-	511-515	-						45
44	-	503-505	515-516	484-488	-	507						44
43	-	500-502	512-514	-	-	504-506						43
42	-	-	511	-	-	501-503						42
41	468-472	-	-	-	506-510	-	I	I	I	I	I	41
40	-	499	506-510	-	-	-						40
39	-	-	-	480-483	-	-	N	N	N	N	N	39
38	-	495-498	504-505	478-479	-	-						38
37	-	-	499-503	-	-	-	S	S	S	S	S	37
36	-	-	492-498	-	-	-						36
35	464-467	494	-	472-477	-	-	U	U	U	U	U	35
34	-	490-493	-	-	501-505	497-500						34
33	-	-	490-491	466-471	500	-	F	F	F	F	F	33
32	-	-	486-489	-	-	-						32
31	-	-	-	-	-	-	F	F	F	F	F	31
30	-	489	-	-	495-499	493-496						30
29	459-463	487-488	484-485	-	-	-	I	I	I	I	I	29
28	-	485-486	478-483	460-465	-	-						28
27	-	-	-	-	-	-	C	C	C	C	C	27
26	-	484	474-477	-	491-494	-						26
25	-	479-483	-	-	489-490	-	I	I	I	I	I	25
24	-	-	-	-	-	490-492						24
23	-	-	473	457-459	-	-	E	E	E	E	E	23
22	455-458	-	467-472	454-456	-	-						22
21	-	474-478	-	-	-	486-489	N	N	N	N	N	21
20	-	469-473	-	-	-	-						20
19	-	-	-	-	484-488	-	T	T	T	T	T	19
18	453-454	468	461-466	447-453	-	-						18
17	450-452	463-467	-	-	-	482-485						17
16	-	-	-	-	-	-						16
15	-	-	-	-	479-483	-	D	D	D	D	D	15
14	-	457-462	454-460	-	-	-						14
13	-	-	-	-	474-478	-	A	A	A	A	A	13
12	-	-	-	440-446	473	-						12
11	-	-	-	-	-	479-481	T	T	T	T	T	11
10	-	452-456	451-453	432-439	-	478						10
9	447-449	451	446-450	-	-	-	A	A	A	A	A	9
8	444-446	-	-	-	-	-						8
7	-	-	-	430-431	468-472	-						7
6	439-443	450	438-445	424-429	-	474-477						6
5	-	437-449	433-437	422-423	463-467	-						5
4	-	-	429-432	415-421	452-462	470-473						4
3	-	-	-	409-414	449-451	-						3
2	433-438	416-436	416-428	390-408	440-448	463-469						2
1	347-432	341-415	363-415	345-389	360-439	369-462						1

AGE 9

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	655-816	665-822	653-832	628-841	681-830	663-826						99
98	636-654	641-664	649-652	618-627	675-680	657-662						98
97	628-635	636-640	635-648	616-617	660-674	639-656						97
96	617-627	623-635	629-634	612-615	651-659	635-638						96
95	612-616	-	626-628	610-611	643-650	620-634						95
94	609-611	616-622	623-625	605-609	637-642	614-619						94
93	601-608	614-615	621-622	598-604	630-636	612-613						93
92	596-600	610-613	617-620	594-597	625-629	610-611						92
91	-	604-609	614-616	593	-	608-609	I	I	I	I	I	91
90	591-595	599-603	613	591-592	621-624	604-607						90
89	590	595-598	612	-	-	597-603	N	N	N	N	N	89
88	587-589	594	-	587-590	616-620	593-596						88
87	584-586	591-593	610-611	582-586	611-615	590-592	S	S	S	S	S	87
86	582-583	589-590	603-609	579-581	-	-						86
85	580-581	585-588	-	573-578	603-610	586-589	U	U	U	U	U	85
84	578-579	584	-	-	-	582-585						84
83	-	-	-	-	-	577-581	F	F	F	F	F	83
82	574-577	-	602	569-572	596-602	574-576						82
81	569-573	579-583	597-601	568	-	-	F	F	F	F	F	81
80	-	-	-	567	592-595	570-573						80
79	565-568	577-578	-	561-566	589-591	566-569	I	I	I	I	I	79
78	562-564	574-576	595-596	-	-	-						78
77	-	571-573	594	555-560	586-588	-	C	C	C	C	C	77
76	560-561	-	593	-	583-585	564-565						76
75	558-559	569-570	-	551-554	-	559-563	I	I	I	I	I	75
74	557	-	-	550	-	-						74
73	-	567-568	590-592	-	580-582	555-558	E	E	E	E	E	73
72	553-556	565-566	587-589	547-549	577-579	-						72
71	-	-	-	544-546	-	551-554	N	N	N	N	N	71
70	552	-	-	-	571-576	-						70
69	549-551	564	585-586	-	-	-	T	T	T	T	T	69
68	-	-	581-584	542-543	-	-						68
67	-	559-563	-	540-541	569-570	548-550						67
66	546-548	-	576-580	539	566-568	-						66
65	545	558	574-575	-	-	545-547	D	D	D	D	D	65
64	541-544	554-557	-	537-538	562-565	544						64
63	537-540	-	571-573	-	-	543	A	A	A	A	A	63
62	-	-	568-570	534-536	-	542						62
61	534-536	549-553	-	-	-	541	T	T	T	T	T	61
60	532-533	548	564-567	533	-	539-540						60
59	530-531	544-547	563	-	559-561	537-538	A	A	A	A	A	59
58	527-529	-	-	-	556-558	-						58
57	-	543	559-562	528-532	-	534-536						57
56	-	539-542	555-558	526-527	-	-						56
55	520-526	-	554	-	-	-						55
54	515-519	-	552-553	523-525	553-555	532-533						54
53	511-514	537-538	-	-	552	530-531						53
52	507-510	534-536	-	519-522	-	-						52
51	506	-	-	-	-	527-529						51
50	498-505	-	550-551	513-518	551	526						50

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AGE 9

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	497	529-533	547-549	-	-	-						49
48	494-496	-	543-546	-	545-550	-						48
47	490-493	528	542	-	543-544	523-525						47
46	-	-	-	509-512	-	-						46
45	-	525-527	-	507-508	-	519-522						45
44	485-489	-	539-541	-	540-542	-						44
43	-	522-524	537-538	-	-	-						43
42	-	520-521	-	-	536-539	-						42
41	482-484	-	536	501-506	-	515-518	I	I	I	I	I	41
40	481	516-519	533-535	-	-	-						40
39	-	515	-	500	-	-	N	N	N	N	N	39
38	477-480	-	532	495-499	530-535	-						38
37	-	511-514	529-531	-	-	512-514	S	S	S	S	S	37
36	-	509-510	527-528	491-494	529	508-511						36
35	-	508	525-526	489-490	-	-	U	U	U	U	U	35
34	-	506-507	-	-	524-528	507						34
33	473-476	-	522-524	-	523	504-506	F	F	F	F	F	33
32	-	504-505	-	-	521-522	-						32
31	-	-	518-521	484-488	517-520	-	F	F	F	F	F	31
30	-	503	-	-	-	-						30
29	-	500-502	517	-	-	501-503	I	I	I	I	I	29
28	-	-	512-516	483	511-516	-						28
27	468-472	499	-	478-482	-	-	C	C	C	C	C	27
26	-	-	511	-	-	-						26
25	-	495-498	506-510	472-477	-	497-500	I	I	I	I	I	25
24	-	-	-	-	506-510	-						24
23	-	493-494	501-505	-	-	-	E	E	E	E	E	23
22	466-467	490-492	-	-	-	-						22
21	464-465	488-489	499-500	466-471	500-505	496	N	N	N	N	N	21
20	-	487	496-498	-	-	493-495						20
19	-	-	492-495	-	495-499	-	T	T	T	T	T	19
18	459-463	485-486	-	461-465	-	-						18
17	-	479-484	-	460	492-494	492						17
16	-	-	486-491	-	489-491	490-491						16
15	-	-	-	458-459	487-488	-	D	D	D	D	D	15
14	-	474-478	480-485	454-457	484-486	-						14
13	-	-	478-479	-	-	489	A	A	A	A	A	13
12	455-458	469-473	474-477	-	479-483	486-488						12
11	-	-	472-473	-	-	-	T	T	T	T	T	11
10	-	-	467-471	-	-	482-485						10
9	451-454	464-468	-	447-453	-	-	A	A	A	A	A	9
8	450	463	461-466	-	-	-						8
7	-	457-462	-	-	473-478	478-481						7
6	446-449	-	-	-	-	-						6
5	444-445	451-456	-	433-446	468-472	474-477						5
4	-	447-450	454-460	427-432	462-467	473						4
3	439-443	444-446	446-453	424-426	455-461	470-472						3
2	-	438-443	429-445	-	448-454	464-469						2
1	347-438	341-437	363-428	345-423	360-446	369-463						1

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AGE 10

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	665-818	665-822	685-832	667-841	714-830	671-826						99
98	649-664	651-664	676-684	645-666	702-713	654-670						98
97	644-648	642-650	660-675	632-644	690-701	649-653						97
96	641-643	639-641	655-659	627-631	661-689	648						96
95	632-640	637-638	651-654	626	659-660	640-647						95
94	629-631	634-636	648-650	618-625	656-658	634-639						94
93	625-628	628-633	637-647	617	651-655	632-633						93
92	621-624	623-627	635-636	615-616	646-650	629-631						92
91	617-620	-	634	611-614	643-645	625-628	I	I	I	I	I	91
90	611-616	622	630-633	-	642	-						90
89	608-610	618-621	629	607-610	637-641	622-624	N	N	N	N	N	89
88	-	610-617	627-628	601-606	631-636	619-621						88
87	605-607	609	624-626	599-600	628-630	618	S	S	S	S	S	87
86	602-604	-	622-623	594-598	625-627	615-617						86
85	600-601	-	-	593	623-624	614	U	U	U	U	U	85
84	599	604-608	621	590-592	622	608-613						84
83	595-598	-	619-620	587-589	612-621	604-607	F	F	F	F	F	83
82	592-594	-	617-618	586	611	601-603						82
81	587-591	601-603	614-616	-	-	598-600	F	F	F	F	F	81
80	586	600	-	583-585	-	597						80
79	583-585	-	-	577-582	610	592-596	I	I	I	I	I	79
78	581-582	-	612-613	574-576	607-609	589-591						78
77	578-580	599	609-611	573	605-606	588	C	C	C	C	C	77
76	574-577	595-598-	606-608	-	603-604	583-587						76
75	569-573	593-594	-	-	-	581-582	I	I	I	I	I	75
74	-	590-592	605	569-572	-	578-580						74
73	565-568	589	603-604	-	-	575-577	E	E	E	E	E	73
72	-	585-588	601-602	567-568	600-602	572-574						72
71	562-564	584	600	564-566	599	570-571	N	N	N	N	N	71
70	-	-	598-599	561-563	596-598	566-569						70
69	561	-	597	-	-	563-565	T	T	T	T	T	69
68	558-560	-	595-596	556-560	-	562						68
67	557	576-583	-	555	593-595	560-561						67
66	555-556	571-575	594	553-554	589-592	556-559						66
65	553-554	569-570	593	552	588	555	D	D	D	D	D	65
64	-	-	-	550-551	587	552-554						64
63	-	565-568	590-592	-	578-586	551	A	A	A	A	A	63
62	549-552	564	587-589	547-549	576-577	-						62
61	-	-	-	-	569-575	548-550	T	T	T	T	T	61
60	546-548	560-563	-	544-546	566-568	544-547						60
59	545	559	586	541-543	565	543	A	A	A	A	A	59
58	541-544	-	-	539-540	562-564	541-542						58
57	540	-	582-585	-	-	-						57
56	537-539	554-558	581	537-538	-	540						56
55	533-536	-	-	533-536	-	537-539						55
54	532	-	580	531-532	-	534-536						54
53	-	-	574-579	528-530	-	-						53
52	529-531	549-553	-	-	-	-						52
51	527-528	-	-	524-527	561	533						51
50	-	548	571-573	523	559-560	530-532						50

AGE 10

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	516-526	-	568-570	518-522	556-558	-						49
48	514-515	545-547	-	-	-	-						48
47	506-513	544	567	513-517	552-555	526-529						47
46	502-505	543	-	-	-	-						46
45	-	541-542	564-566	-	-	523-525						45
44	497-501	538-540	563	510-512	-	-						44
43	494-496	-	-	507-509	551	520-522						43
42	-	537-538	559-562	-	-	519						42
41	-	-	-	-	-	-	I	I	I	I	I	41
40	490-493	534-536	557-558	-	546-550	516-518						40
39	-	-	556	501-506	543-545	515	N	N	N	N	N	39
38	-	-	552-555	-	-	-						38
37	487-489	-	-	-	-	-	S	S	S	S	S	37
36	485-486	531-533	-	-	-	512-514						36
35	-	529-530	-	500	-	-	U	U	U	U	U	35
34	484	-	548-551	495-499	541-542	511						34
33	481-483	-	547	-	540	508-510	F	F	F	F	F	33
32	-	525-528	-	-	536-539	-						32
31	477-480	522-524	543-546	490-494	535	-	F	F	F	F	F	31
30	-	520-521	542	489	529-534	504-507						30
29	-	516-519	-	-	-	-	I	I	I	I	I	29
28	473-476	-	537-541	-	-	-						28
27	-	515	535-536	-	523-528	501-503	C	C	C	C	C	27
26	-	-	533-534	-	-	-						26
25	-	514	532	-	517-522	-	I	I	I	I	I	25
24	-	509-513	529-531	484-488	-	-						24
23	468-472	-	527-528	-	-	-	E	E	E	E	E	23
22	-	506-508	-	-	-	-						22
21	-	504-505	526	478-483	512-516	497-500	N	N	N	N	N	21
20	-	-	525	-	511	-						20
19	-	500-503	520-524	-	-	-	T	T	T	T	T	19
18	-	499	518-519	472-477	-	493-496						18
17	464-467	494-498	512-517	-	506-510	490-492						17
16	-	490-493	511	470-471	-	-						16
15	-	487-489	505-510	466-469	-	-	D	D	D	D	D	15
14	-	485-486	502-504	-	500-505	-						14
13	-	479-484	499-501	460-465	495-499	486-489	A	A	A	A	A	13
12	459-463	474-478	496-498	-	-	-						12
11	-	469-473	486-495	458-459	489-494	485	T	T	T	T	T	11
10	-	-	484-485	454-457	-	482-484						10
9	-	-	480-483	-	487-488	-	A	A	A	A	A	9
8	455-458	463-468	474-479	452-453	484-486	-						8
7	-	462	462-473	445-451	480-483	478-481						7
6	-	457-461	461	440-444	479	-						6
5	450-454	451-456	454-460	432-439	471-478	-						5
4	444-449	-	446-453	-	464-470	474-477						4
3	-	445-450	438-445	424-431	462-463	470-473						3
2	-	438-444	421-437	-	453-461	465-469						2
1	347-443	341-437	363-420	345-423	360-452	369-464						1

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AGE 11

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	715-816	698-822	702-832	705-841	717-830	697-826						99
98	687-714	682-697	685-701	688-704	703-716	670-696						98
97	667-686	669-681	677-684	674-687	689-702	665-669						97
96	663-666	665-668	672-676	670-673	681-688	659-664						96
95	657-662	658-664	-	659-669	675-680	655-658						95
94	650-656	652-657	-	651-658	668-674	649-654						94
93	637-649	649-651	671	648-650	664-667	645-648						93
92	635-636	645-648	669-670	640-647	660-663	640-644						92
91	632-634	643-644	665-668	635-639	659	638-639	I	I	I	I	I	91
90	628-631	639-642	661-664	629-634	656-658	-						90
89	624-627	637-638	659-660	626-628	651-655	633-637	N	N	N	N	N	89
88	623	634-636	-	622-625	-	632						88
87	617-622	-	653-658	621	649-650	623-631	S	S	S	S	S	87
86	614-616	628-633	651-652	618-620	646-648	521-622						86
85	611-613	-	648-650	615-617	-	618-620	U	U	U	U	U	85
84	609-610	623-627	643-647	611-614	642-645	615-617						84
83	608	620-622	642	609-610	639-641	614	F	F	F	F	F	83
82	605-607	618-619	639-641	606-608	637-638	610-613						82
81	602-604	617	635-638	603-605	633-636	608-609	F	F	F	F	F	81
80	599-601	614-616	-	602	631-632	607						80
79	-	-	634	599-601	627-630	-	I	I	I	I	I	79
78	596-598	610-613	629-633	597-598	625-626	604-606						78
77	593-595	609	-	595-596	-	601-603	C	C	C	C	C	77
76	590-592	-	-	594	623-624	598-600						76
75	587-589	604-608	625-628	591-593	621-622	-	I	I	I	I	I	75
74	-	-	624	587-590	-	596-597						74
73	584-586	-	622-623	583-586	620	593-595	E	E	E	E	E	73
72	581-583	600-603	-	-	619	591-592						72
71	578-580	-	621	579-582	615-618	590	N	N	N	N	N	71
70	577	599	619-620	577-578	-	-						70
69	-	598	617-618	575-576	-	588-589	T	T	T	T	T	69
68	574-576	595-597	-	573-574	611-614	585-587						68
67	-	-	613-616	-	-	582-584						67
66	571-573	591-594	-	-	607-610	581						66
65	569-570	590	611-612	571-572	605-606	577-580	D	D	D	D	D	65
64	568	585-589	610	569-570	602-604	574-576						64
63	567	584	606-609	567-568	596-601	572-573	A	A	A	A	A	63
62	565-566	580-583	605	-	-	570-571						62
61	-	579	603-604	565-566	-	568-569	T	T	T	T	T	61
60	562-564	-	-	564	-	564-567						60
59	-	575-578	602	561-563	595	560-563	A	A	A	A	A	59
58	558-561	574	601	-	590-594	558-559						58
57	557	-	599-600	-	589	-						57
56	-	572-573	598	558-560	587-588	555-557						56
55	555-556	569-571	-	555	-	552-554						55
54	553-554	-	597	552-554	586	550-551						54
53	-	-	595-596	547-551	583-585	548-549						53
52	551-552	-	593-594	-	-	-						52
51	549-550	565-568	-	544-546	582	-						51
50	-	564	591-592	-	-	547						50

AGE 11

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	547-548	-	590	-	578-581	544-546						49
48	545-546	-	-	542-543	577	-						48
47	-	560-563	587-589	539-541	575-576	541-543						47
46	-	559	584-586	-	573-574	539-540						46
45	541-544	-	582-583	537-538	571-572	537-538						45
44	-	-	581	534-536	-	-						44
43	539-540	555-558	-	-	566-570	-						43
42	537-538	554	578-580	528-533	-	534-536						42
41	535-536	-	575-577	527	565	530-533	I	I	I	I	I	41
40	532-534	549-553	573-574	526	562-564	-						40
39	528-531	-	571-572	523-525	-	-	N	N	N	N	N	39
38	527	-	568-570	-	-	526-529						38
37	-	548	-	519-522	561	-	S	S	S	S	S	37
36	519-526	544-547	567	518	556-560	-						36
35	512-518	-	-	-	554-555	523-525	U	U	U	U	U	35
34	508-511	542-543	564-566	516-517	552-553	-						34
33	506-507	539-541	563	513-515	-	-	F	F	F	F	F	33
32	502-505	-	-	-	-	-						32
31	-	-	559-562	507-512	551	-	F	F	F	F	F	31
30	498-501	537-538	-	-	543-550	519-522						30
29	495-497	534-536	557-558	-	-	-	I	I	I	I	I	29
28	494	-	553-556	-	-	-						28
27	490-493	-	552	501-506	-	515-518	C	C	C	C	C	27
26	-	531-533	-	-	539-542	-						26
25	-	529-530	-	-	536-538	512-514	I	I	I	I	I	25
24	485-489	526-528	-	496-500	-	-						24
23	-	525	548-551	495	-	-	E	E	E	E	E	23
22	484	-	-	-	535	508-511						22
21	481-483	516-524	543-547	490-494	530-534	504-507	N	N	N	N	N	21
20	-	515	-	489	529	-						20
19	477-480	-	542	484-488	-	-	T	T	T	T	T	19
18	-	509-514	-	-	524-528	-						18
17	473-476	506-508	538-541	-	523	501-503						17
16	-	504-505	537	-	-	-						16
15	-	-	534-536	478-483	-	497-500	D	D	D	D	D	15
14	-	499-503	532-533	-	518-522	-						14
13	468-472	-	-	-	517	493-496	A	A	A	A	A	13
12	-	494-498	520-531	472-477	511-516	492						12
11	464-467	493	517-519	-	506-510	490-491	T	T	T	T	T	11
10	-	-	516	-	-	-						10
9	-	490-492	511-515	466-471	500-505	-	A	A	A	A	A	9
8	462-463	487-489	506-510	-	-	486-489						8
7	459-461	479-486	498-505	-	496-499	-						7
6	-	473-478	488-497	460-465	495	-						6
5	455-458	463-472	486-487	-	489-494	482-485						5
4	453-454	-	474-485	454-459	-	478-481						4
3	450-452	457-462	455-473	-	475-488	-						3
2	444-449	451-456	438-454	447-453	473-474	472-477						2
1	347-443	341-450	363-437	345-446	360-472	369-471						1

AGE 12

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	703-816	708-822	721-832	709-841	717-830	694-826						99
98	692-702	695-707	704-720	698-708	714-716	676-693						98
97	679-691	694	697-703	690-697	702-713	668-675						97
96	674-678	690-693	696	684-689	696-701	665-667						96
95	670-673	683-689	688-695	679-683	688-695	658-664						95
94	661-669	676-682	-	672-678	684-687	653-657						94
93	659-660	671-675	-	664-671	680-683	651-652						93
92	655-658	667-670	684-687	659-663	677-679	649-650						92
91	649-654	663-666	681-683	656-658	672-676	645-648	I	I	I	I	I	91
90	643-648	660-662	679-680	649-655	667-671	643-644						90
89	638-642	658-659	675-678	644-648	665-666	642	N	N	N	N	N	89
88	636-637	655-657	672-674	638-643	663-664	639-641						88
87	634-635	651-654	669-671	634-637	662	637-638	S	S	S	S	S	87
86	631-633	648-650	664-668	631-633	658-661	635-636						86
85	625-630	-	661-663	629-630	656-657	-	U	U	U	U	U	85
84	621-624	645-647	660	626-628	654-655	632-634						84
83	618-620	643-644	659	622-625	651-653	631	F	F	F	F	F	83
82	614-617	642	-	621	-	628-630						82
81	611-613	639-641	-	617-620	-	627	F	F	F	F	F	81
80	-	637-638	657-658	614-616	647-650	625-626						80
79	610	636	655-656	611-613	646	623-624	I	I	I	I	I	79
78	608-609	634-635	654	610	-	621-622						78
77	-	-	653	607-609	643-645	618-620	C	C	C	C	C	77
76	605-607	633	648-652	606	-	617						76
75	602-604	-	646-647	602-605	641-642	616	I	I	I	I	I	75
74	599-601	-	643-645	-	638-640	615						74
73	596-598	629-632	642	601	637	-	E	E	E	E	E	73
72	593-595	628	640-641	599-600	636	613-614						72
71	590-592	-	639	598	633-635	612	N	N	N	N	N	71
70	-	625-627	-	595-597	632	611						70
69	-	623-624	638	592-594	631	609-610	T	T	T	T	T	69
68	587-589	-	635-637	587-591	629-630	-						68
67	-	620-622	631-634	586	626-628	605-608						67
66	-	619	-	585	625	604						66
65	584-586	618	629-630	583-584	621-624	601-603	D	D	D	D	D	65
64	583	615-617	627-628	582	-	598-600						64
63	582	614	624-626	581	618-620	593-597	A	A	A	A	A	63
62	578-581	610-613	-	579-580	615-617	590-592						62
61	-	609	623	577-578	-	588-589	T	T	T	T	T	61
60	574-577	-	622	575-576	611-614	585-587						60
59	-	605-608	-	573-574	610	583-584	A	A	A	A	A	59
58	571-573	604	621	-	603-609	582						58
57	-	-	620	-	-	580-581						57
56	569-570	601-603	-	571-572	602	579						56
55	568	600	-	569-570	600-601	577-578						55
54	565-567	595-599	619	567-568	597-599	574-576						54
53	-	593-594	617-618	566	596	570-573						53
52	562-564	590-592	-	563-565	591-595	569						52
51	-	589	615-616	561-562	589-590	566-568						51
50	558-561	585-588	613-614	-	-	562-565						50

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Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	-	-	-	-	560-561						49
48	557	584	612	556-560	586-588	559						48
47	-	-	610-611	555	583-585	-						47
46	555-556	582-583	609	-	-	555-558						46
45	553-554	580-581	606-608	551-554	582	-						45
44	551-552	579	-	550	-	551-554						44
43	549-550	-	605	547-549	577-581	-						43
42	-	575-578	602-604	-	-	548-550						42
41	-	574	599-601	544-546	-	544-547	I	I	I	I	I	41
40	546-548	-	595-598	542-543	574-576	-						40
39	545	569-573	594	539-541	571-573	543	N	N	N	N	N	39
38	-	-	593	-	-	541-542						38
37	-	-	590-592	-	-	-	S	S	S	S	S	37
36	541-544	564-568	587-589	536-538	566-570	-						36
35	-	-	586	534-535	-	539-540	U	U	U	U	U	35
34	537-540	560-563	583-585	532-533	563-565	537-538						34
33	-	554-559	582	528-531	562	-	F	F	F	F	F	33
32	532-536	-	581	524-527	-	534-536						32
31	-	549-553	579-580	523	-	-	F	F	F	F	F	31
30	527-531	548	576-578	518-522	-	-						30
29	-	544-547	574-575	-	561	530-533	I	I	I	I	I	29
28	520-526	542-543	-	513-517	-	526-529						28
27	-	539-541	-	-	560	-	C	C	C	C	C	27
26	506-519	538	571-573	507-512	556-559	523-525						26
25	500-505	537	568-570	-	-	-	I	I	I	I	I	25
24	498-499	534-536	-	-	555	-						24
23	494-497	533	564-567	-	552-554	519-522	E	E	E	E	E	23
22	490-493	529-532	-	501-506	-	-						22
21	-	-	563	-	551	-	N	N	N	N	N	21
20	485-489	525-528	562	-	545-550	-						20
19	483-484	-	557-561	496-500	543-544	515-518	T	T	T	T	T	19
18	481-482	520-524	554-556	495	-	-						18
17	-	518-519	552-553	490-494	542	512-514						17
16	-	515-517	549-551	489	536-541	-						16
15	477-480	-	547-548	-	535	509-511	D	D	D	D	D	15
14	-	509-514	545-546	-	530-534	507-508						14
13	-	506-508	542-544	484-488	529	502-506	A	A	A	A	A	13
12	473-476	504-505	537-541	-	524-528	501						12
11	472	500-503	536	-	521-523	-	T	T	T	T	T	11
10	468-471	499	532-535	478-483	517-520	497-500						10
9	-	493-498	527-531	-	-	493-496	A	A	A	A	A	9
8	464-467	492	525-526	-	511-516	-						8
7	-	487-491	522-524	472-477	-	490-492						7
6	459-463	485-486	518-521	466-471	506-510	487-489						6
5	457-458	-	511-517	460-465	503-505	486						5
4	450-456	474-484	499-510	454-459	495-502	482-485						4
3	448-449	469-473	492-498	447-453	-	-						3
2	442-447	463-468	473-491	446	489-494	476-481						2
1	347-441	341-462	363-472	345-445	360-488	369-475						1

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AGE 13 **AGE 13** **AGE 13**

AGE 13

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	688-816	750-822	771-832	727-841	737-830	702-826						99
98	684-687	718-749	729-770	716-726	729-736	678-701						98
97	675-683	708-717	716-728	699-715	716-728	674-677						97
96	673-674	703-707	708-715	693-698	700-715	668-673						96
95	663-672	697-702	704-707	688-692	699-708	667						95
94	659-662	693-696	703	683-687	696-698	663-666						94
93	654-658	689-692	698-702	679-682	692-695	657-662						93
92	648-653	677-688	696-697	675-678	685-691	656						92
91	644-647	672-676	693-695	671-674	683-684	653-655	I	I	I	I	I	91
90	643	-	-	664-670	680-682	652						90
89	641-642	-	688-692	659-663	675-679	648-651	N	N	N	N	N	89
88	640	669-671	-	654-658	-	645-647						88
87	638-639	667-668	686-687	652-653	672-674	644	S	S	S	S	S	87
86	635-637	665-666	681-685	650-651	670-671	642-643						86
85	631-634	663-664	679-680	647-649	668-669	641	U	U	U	U	U	85
84	628-630	662	677-678	644-646	-	638-640						84
83	626-627	657-661	675-676	642-643	664-667	637	F	F	F	F	F	83
82	625	-	674	640-641	661-663	635-636						82
81	622-624	655-656	671-673	-	660	632-634	F	F	F	F	F	81
80	618-621	654	670	636-639	659	630-631						80
79	617	653	669	633-635	658	628-629	I	I	I	I	I	79
78	-	652	668	-	655-657	623-627						78
77	614-616	650-651	667	631-632	653-654	622	C	C	C	C	C	77
76	612-613	648-649	665-666	630	651-652	621						76
75	610-611	-	664	624-629	-	619-620	I	I	I	I	I	75
74	608-609	646-647	661-663	622-623	-	618						74
73	-	645	660	618-621	649-650	616-617	E	E	E	E	E	73
72	605-607	643-644	-	-	-	615						72
71	-	642	658-659	611-617	646-648	612-614	N	N	N	N	N	71
70	602-604	639-641	655-657	610	643-645	611						70
69	-	-	653-654	606-609	-	610	T	T	T	T	T	69
68	-	637-638	651-652	602-605	641-642	609						68
67	597-601	636	649-650	600-601	638-640	-						67
66	596	634-635	647-648	598-599	637	607-608						66
65	595	-	646	597	632-636	605-606	D	D	D	D	D	65
64	593-594	-	644-645	594-596	631	604						64
63	-	630-633	643	592-593	-	601-603	A	A	A	A	A	63
62	590-592	628-629	642	591	-	598-600						62
61	587-589	625-627	639-641	590	625-630	-	T	T	T	T	T	61
60	-	-	-	587-589	-	597						60
59	586	623-624	636-638	586	623-624	596	A	A	A	A	A	59
58	584-585	-	635	-	622	593-595						58
57	582-583	-	-	583-585	621	-						57
56	580-581	622	-	581-582	-	590-592						56
55	578-579	619-621	634	580	-	589						55
54	577	618	631-633	579	617-620	588						54
53	575-576	-	629-630	577-578	615-616	585-587						53
52	574	615-617	-	573-576	611-614	582-584						52
51	570-573	614	627-628	-	-	580-581						51
50	569	-	625-626	-	-	578-579						50

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AGE 13

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	610-613	624	571-572	605-610	574-577						49
48	568	609	-	569-570	-	572-573						48
47	-	-	-	-	-	570-571						47
46	565-567	605-608	621-623	-	603-604	-						46
45	-	-	620	567-568	-	569						45
44	562-564	604	-	564-566	-	566-568						44
43	558-561	603	617-619	561-563	600-602	-						43
42	-	600-602	-	-	599	562-565						42
41	557	599	614-616	-	596-598	561	I	I	I	I	I	41
40	-	598	613	556-560	591-595	559-560						40
39	553-556	595-597	612	555	589-590	-	N	N	N	N	N	39
38	-	594	607-611	550-554	-	558						38
37	-	590-593	606	-	-	555-557	S	S	S	S	S	37
36	-	-	605	547-549	587-588	-						36
35	549-552	587-589	602-604	544-546	-	552-554	U	U	U	U	U	35
34	-	585-586	598-601	542-543	583-586	550-551						34
33	547-548	584	-	540-541	-	545-549	F	F	F	F	F	33
32	545-546	-	594-597	538-539	-	544						32
31	-	580-583	591-593	534-537	582	-	F	F	F	F	F	31
30	-	579	590	-	578-581	543						30
29	541-544	-	-	-	577	541-542	I	I	I	I	I	29
28	-	576-578	587-589	533	-	-						28
27	539-540	574-575	583-586	528-532	-	-	C	C	C	C	C	27
26	537-538	569-573	582	-	571-576	540						26
25	-	564-568	581	525-527	-	537-539	I	I	I	I	I	25
24	532-536	-	577-580	523-524	566-570	534-536						24
23	-	559-563	574-576	-	-	533	E	E	E	E	E	23
22	-	554-558	573	518-522	562-565	530-532						22
21	530-531	548-553	570-572	513-517	561	526-529	N	N	N	N	N	21
20	524-529	-	568-569	-	556-560	-						20
19	514-523	546-547	567	507-512	-	525	T	T	T	T	T	19
18	511-513	543-545	565-566	-	552-555	523-524						18
17	506-510	538-542	563-564	-	-	-						17
16	498-505	537	-	501-506	-	-						16
15	-	534-536	559-562	-	550-551	519-522	D	D	D	D	D	15
14	490-497	-	557-558	496-500	543-549	-						14
13	485-489	531-533	555-556	-	540-542	515-518	A	A	A	A	A	13
12	481-484	-	552-554	494-495	536-539	513-514						12
11	479-480	529-530	548-551	490-493	535	512	T	T	T	T	T	11
10	477-478	525-528	543-547	489	529-534	508-511						10
9	473-476	515-524	539-542	-	527-528	504-507	A	A	A	A	A	9
8	-	506-514	532-538	484-488	523-526	-						8
7	468-472	504-505	525-531	478-483	-	497-503						7
6	-	497-503	514-524	-	511-522	493-496						6
5	-	487-496	506-513	473-477	506-510	490-492						5
4	464-467	482-486	499-505	466-472	500-505	-						4
3	459-463	474-481	483-498	460-465	492-499	486-489						3
2	451-458	464-473	464-482	454-459	479-491	478-485						2
1	347-450	341-463	363-463	345-453	360-478	369-477						1

AGE 14

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	712-816	757-822	797-832	739-841	782-830	710-826	715-808	727-795				99
98	702-711	737-756	748-796	721-738	742-781	691-709	702-714	705-726				98
97	691-701	721-736	734-747	711-720	720-741	681-690	699-701	691-704				97
96	684-690	715-720	733	707-710	714-719	675-680	693-698	682-690				96
95	679-683	708-714	728-732	698-706	711-713	671-674	682-692	676-681				95
94	676-678	703-707	722-727	-	706-710	665-670	681	672-675				94
93	670-675	702	720-721	693-697	703-705	659-664	676-680	663-671				93
92	665-669	-	717-719	688-692	701-702	-	674-675	661-662				92
91	662-664	697-701	713-716	686-687	696-700	656-658	-	653-660	I	I	I	91
90	652-661	695-696	710-712	683-685	691-695	653-655	673	651-652				90
89	-	692-694	709	679-682	-	651-652	667-672	-	N	N	N	89
88	649-651	-	-	678	688-690	648-650	-	-				88
87	-	691	707-708	674-677	686-687	646-647	666	649-650	S	S	S	87
86	644-648	687-690	704-706	-	683-685	642-645	661-665	647-648				86
85	640-643	683-686	699-703	671-673	680-682	-	658-660	646	U	U	U	85
84	-	678-682	696-698	668-670	677-679	639-641	656-657	-				84
83	638-639	677	691-695	666-667	675-676	638	655	643-645	F	F	F	83
82	636-637	676	688-690	663-665	-	-	653-654	641-642				82
81	635	672-675	-	659-662	670-674	635-637	-	640	F	F	F	81
80	633-634	668-671	687	654-658	668-669	-	650-652	-				80
79	631-632	666-667	685-686	652-653	-	-	647-649	-	I	I	I	79
78	629-630	664-665	682-684	647-651	666-667	633-634	-	-				78
77	626-628	662-663	681	645-646	665	632	-	637-639	C	C	C	77
76	625	660-661	680	644	664	630-631	-	636				76
75	623-624	658-659	679	640-643	662-663	629	646	635	I	I	I	75
74	621-622	657	676-678	637-639	661	628	-	-				74
73	-	653-656	675	630-636	659-660	627	645	634	E	E	E	73
72	620	652	-	629	-	-	644	631-633				72
71	617-619	-	674	626-628	-	625-626	643	629-630	N	N	N	71
70	614-616	651	672-673	-	656-658	624	641-642	628				70
69	611-613	649-650	-	623-625	652-655	623	640	-	T	T	T	69
68	609-610	648	668-671	622	651	620-622	639	626-627				68
67	605-608	-	665-667	621	-	618-619	638	625				67
66	-	645-647	-	618-620	647-650	-	-	-				66
65	602-604	-	664	614-617	646	616-617	636-637	624	D	D	D	65
64	-	644	663	613	-	-	-	623				64
63	599-601	643	660-662	610-612	645	615	-	622	A	A	A	63
62	-	639-642	-	609	642-644	614	635	620-621				62
61	596-598	-	-	607-608	641	612-613	-	-	T	T	T	61
60	-	637-638	-	604-606	-	-	633-634	-				60
59	593-595	-	659	602-603	639-640	611	632	619	A	A	A	59
58	-	635-636	656-658	601	637-638	609-610	-	618				58
57	590-592	634	-	599-600	-	-	630-631	615-617				57
56	-	-	-	598	636	607-608	629	-				56
55	587-589	-	654-655	-	633-635	-	627-628	-				55
54	-	631-633	653	596-597	632	605-606	626	614				54
53	586	630	651-652	594-595	631	601-604	624-625	-				53
52	584-585	629	649-650	588-593	-	-	623	-				52
51	583	625-628	648	586-587	-	600	-	-				51
50	582	623-624	646-647	582-585	625-630	598-599	622	613				50

AGE 14

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	581	-	643-645	581	623-624	-	-	611-612				49
48	578-580	-	641-642	580	622	596-597	-	-				48
47	577	-	639-640	579	621	-	617-621	609-610				47
46	-	620-622	-	-	-	593-595	616	-				46
45	574-576	619	636-638	577-578	620	590-592	-	-				45
44	-	618	635	-	619	588-589	-	608				44
43	-	616-617	634	-	611-618	-	-	607				43
42	571-573	-	632-633	572-576	610	585-587	-	605-606				42
41	569-570	614-615	631	569-571	609	583-584	-	603-604	I	I	I	41
40	-	-	628-630	-	607-608	582	-	-				40
39	568	-	627	-	605-606	580-581	-	-	N	N	N	39
38	-	610-613	625-626	568	-	579	610-615	602				38
37	565-567	-	624	567	603-604	575-578	-	601	S	S	S	37
36	-	609	-	565-566	-	572-574	-	599-600				36
35	564	605-608	620-623	561-564	601-602	570-571	-	598	U	U	U	35
34	562-563	604	-	559-560	600	569	-	-				34
33	561	-	617-619	556-558	596-599	-	-	596-597	F	F	F	33
32	558-560	603	614-616	552-555	-	564-568	-	-				32
31	-	599-602	613	550-551	-	562-563	-	-	F	F	F	31
30	557	598	-	545-549	-	558-561	-	594-595				30
29	-	595-597	612	542-544	590-595	555-557	609	593	I	I	I	29
28	554-556	591-594	609-611	541	589	-	604-608	-				28
27	551-553	587-590	608	539-540	-	552-554	-	-	C	C	C	27
26	549-550	585-586	603-607	535-538	-	549-551	-	-				26
25	546-548	580-584	599-602	534	587-588	548	-	-	I	I	I	25
24	545	579	594-598	528-533	-	544-547	-	591-592				24
23	541-544	575-578	593	-	-	541-543	600-603	587-590	E	E	E	23
22	540	574	590-592	-	582-586	538-540	599	-				22
21	537-539	569-573	588-589	526-527	579-581	537	-	586	N	N	N	21
20	-	566-568	587	523-525	571-578	534-536	-	582-585				20
19	532-536	564-565	586	520-522	-	-	-	-	T	T	T	19
18	-	561-563	579-585	516-519	568-570	530-533	593-598	581				18
17	-	559-560	578	513-515	566-567	-	-	580				17
16	527-531	554-558	575-577	-	562-565	-	-	577-579				16
15	524-526	-	574	507-512	-	526-529	-	-	D	D	D	15
14	515-523	548-553	571-573	-	556-561	523-525	-	575-576				14
13	506-514	544-547	564-570	-	552-555	519-522	588-592	571-574	A	A	A	13
12	498-505	543	563	501-506	-	-	-	-				12
11	494-497	537-542	559-562	-	551	515-518	584-587	-	T	T	T	11
10	-	533-536	552-558	495-500	543-550	-	583	570				10
9	490-493	529-532	548-551	490-494	537-542	513-514	-	568-569	A	A	A	9
8	485-489	525-528	546-547	489	535-536	512	577-582	567				8
7	-	520-524	542-545	484-488	530-534	507-511	-	565-566				7
6	481-484	513-519	536-541	477-483	525-529	504-506	571-576	560-564				6
5	477-480	509-512	532-535	472-476	517-524	501-503	567-570	-				5
4	473-476	503-508	526-531	467-471	509-516	494-500	561-566	554-559				4
3	470-472	490-502	512-525	463-466	502-508	490-493	-	541-553				3
2	468-469	487-489	508-511	454-462	489-501	-	555-560	-				2
1	347-467	341-486	363-507	345-453	360-488	369-489	458-554	460-540				1

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AGE 15 **AGE 15** **AGE 15**

AGE 15

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	712-816	757-822	784-832	774-841	807-830	730-826	756-808	771-795	720-807	706-812	751-809	99
98	706-711	747-756	757-783	746-773	-	718-729	740-755	715-770	701-719	699-705	722-750	98
97	697-705	745-746	748-756	736-745	782-806	692-715	716-739	711-714	696-700	693-696	712-721	97
96	682-696	736-744	741-747	727-735	766-781	682-691	692-715	696-710	690-695	687-692	706-711	96
95	676-681	728-735	728-740	721-726	748-765	675-681	682-691	692-695	686-689	684-686	696-705	95
94	674-675	722-727	-	714-720	743-747	670-674	681	683-691	685	677-683	687-695	94
93	670-673	715-721	722-727	705-713	725-742	669	679-680	682	684	675-676	683-686	93
92	664-669	714	720-721	701-704	718-724	667-668	674-678	681	680-683	672-674	680-682	92
91	661-663	712-713	717-719	698-700	711-717	665-666	-	675-680	-	670-671	672-679	91
90	-	708-711	-	695-697	707-710	664	673	673-674	679	667-669	669-671	90
89	658-660	703-707	714-716	688-694	705-706	659-663	-	669-672	673-678	665-666	-	89
88	655-657	-	713	686-687	702-704	658	667-672	668	-	662-664	663-668	88
87	-	697-702	-	-	701	656-657	-	663-667	-	658-661	659-662	87
86	652-654	-	709-712	684-685	697-700	654-655	-	662	669-672	653-657	657-658	86
85	651	693-696	708	679-683	696	652-653	663-666	657-661	668	-	653-656	85
84	649-650	692	704-707	678	692-695	651	661-662	656	667	651-652	650-652	84
83	646-648	691	699-703	674-677	690-691	649-650	-	652-655	666	650	648-649	83
82	645	686-690	-	673	688-689	648	-	651	664-665	648-649	646-647	82
81	643-644	683-685	696-698	667-672	687	-	-	-	663	644-647	643-645	81
80	641-642	-	695	663-666	684-686	647	-	-	660-662	643	642	80
79	639-640	681-682	692-694	662	681-683	645-646	-	647-650	657-659	640-642	640-641	79
78	-	678-680	-	659-661	679-680	644	659-660	646	-	-	-	78
77	637-638	676-677	691	-	677-678	642-643	-	-	-	639	637-639	77
76	636	-	688-690	658	-	641	657-658	644-645	655-656	638	-	76
75	635	673-675	-	657	675-676	640	656	641-643	654	637	-	75
74	632-634	672	684-687	655-656	673-674	639	655	640	653	636	636	74
73	629-631	-	683	654	-	638	-	-	-	634-635	635	73
72	628	670-671	681-682	649-653	668-672	-	653-654	-	652	-	634	72
71	625-627	667-669	-	647-648	-	637	-	-	651	-	-	71
70	-	-	677-680	646	666-667	-	-	637-639	-	632-633	-	70
69	623-624	664-666	675-676	645	665	635-636	-	635-636	650	631	632-633	69
68	620-622	-	-	641-644	662-664	-	652	-	648-649	-	631	68
67	-	-	674	640	661	-	650-651	634	-	630	-	67
66	617-619	663	672-673	638-639	659-660	634	-	633	647	-	627-630	66
65	-	658-662	671	635-637	658	632-633	647-649	-	-	629	625-626	65
64	615-616	657	669-670	632-634	657	631	-	-	-	628	-	64
63	612-614	-	668	630-631	656	629-630	646	632	-	627	624	63
62	611	655-656	667	627-629	654-655	628	644-645	630-631	643-646	626	622-623	62
61	-	653-654	665-666	624-626	651-653	626-627	-	629	-	624-625	620-621	61
60	607-610	651-652	664	622-623	-	625	-	628	642	-	617-619	60
59	605-606	650	663	621	-	623-624	641-643	-	641	623	-	59
58	602-604	-	-	618-620	-	622	639-640	-	640	620-622	615-616	58
57	600-601	648-649	660-662	614-617	648-650	618-621	-	626-627	639	-	-	57
56	599	646-647	-	613	646-647	616-617	638	-	637-638	619	614	56
55	596-598	645	659	611-612	-	615	636-637	-	636	618	613	55
54	-	644	-	608-610	643-645	-	-	625	-	617	611-612	54
53	-	643	-	606-607	642	614	634-635	-	-	-	-	53
52	593-595	639-642	658	603-605	641	612-613	633	-	-	614-616	-	52
51	590-592	-	656-657	602	637-640	-	632	624	634-635	-	608-610	51
50	-	-	654-655	599-601	-	608-611	631	-	632-633	-	607	50

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AGE 15

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	637-638	652-653	597-598	-	607	630	622-623	-	613	606	49
48	-	635-636	651	594-596	636	605-606	629	621	631	611-612	604-605	48
47	589	634	-	592-593	-	604	-	-	628-630	-	-	47
46	587-588	-	649-650	591	632-635	-	628	620	-	608-610	602-603	46
45	584-586	-	648	590	-	598-603	627	619	-	607	601	45
44	-	633	647	587-589	631	-	626	-	626-627	-	-	44
43	582-583	630-632	646	586	629-630	596-597	623-625	618	-	605-606	600	43
42	578-581	629	643-645	-	627-628	-	-	617	625	604	599	42
41	576-577	628	642	582-585	626	593-595	622	615-616	624	601-603	598	41
40	574-575	625-627	-	581	625	592	-	-	623	-	597	40
39	-	-	640-641	579-580	621-624	589-591	-	614	621-622	599-600	594-596	39
38	571-573	623-624	639	-	620	585-588	620-621	613	-	598	-	38
37	-	-	-	577-578	617-619	583-584	616-619	-	619-620	-	-	37
36	569-570	620-622	635-638	-	615-616	580-582	-	611-612	618	-	-	36
35	-	618-619	634	575-576	614	577-579	-	-	-	596-597	-	35
34	568	614-617	631-633	571-574	611-613	576	-	609-610	-	-	591-593	34
33	565-567	610-613	-	567-570	-	575	610-615	606-608	617	594-595	-	33
32	-	-	629-630	-	-	573-574	-	-	-	-	-	32
31	562-564	609	624-628	565-566	609-610	570-572	-	-	612-616	592-593	-	31
30	-	-	-	562-564	607-608	566-569	-	603-605	-	591	588-590	30
29	561	605-608	621-623	561	603-606	565	609	601-602	-	-	587	29
28	557-560	604	620	-	-	562-564	604-608	-	608-611	-	-	28
27	-	600-603	617-619	-	600-602	559-561	-	-	606-607	588-590	-	27
26	553-556	-	615-616	559-560	599	558	-	599-600	-	587	585-586	26
25	-	598-599	614	556-558	596-598	555-557	-	598	-	584-586	-	25
24	551-552	595-597	613	555	-	551-554	-	-	605	581-583	584	24
23	549-550	594	612	552-554	594-595	548-550	599-603	597	601-604	-	582-583	23
22	-	586-593	609-611	550-551	591-593	544-547	-	595-596	-	-	-	22
21	547-548	585	606-608	547-549	588-590	541-543	-	593-594	600	-	578-581	21
20	545-546	580-584	605	544-546	583-587	540	593-598	-	-	577-580	-	20
19	-	579	603-604	-	578-582	537-539	-	589-592	598-599	-	-	19
18	541-544	575-578	601-602	542-543	577	-	-	585-588	596-597	574-576	574-577	18
17	537-540	574	597-600	539-541	571-576	534-536	-	582-584	595	570-573	-	17
16	533-536	569-573	595-596	-	-	-	-	-	-	569	571-573	16
15	532	-	593-594	537-538	568-570	530-533	588-592	581	-	567-568	-	15
14	527-531	564-568	587-592	531-536	564-567	526-529	-	577-580	591-594	-	-	14
13	520-526	559-563	582-586	526-530	562-563	-	-	575-576	589-590	566	568-570	13
12	511-519	554-558	578-581	520-525	558-561	523-525	583-587	574	585-588	564-565	567	12
11	502-510	-	574-577	513-519	556-557	519-522	-	572-573	-	-	565-566	11
10	496-501	548-553	571-573	507-512	552-555	515-518	581-582	571	584	-	-	10
9	490-495	544-547	565-570	-	543-551	512-514	577-580	-	579-583	561-563	561-564	9
8	485-489	543	556-564	501-506	-	-	-	568-570	578	557-560	-	8
7	477-484	534-542	553-555	496-500	-	504-511	-	566-567	577	553-556	560	7
6	473-476	531-533	543-552	489-495	529-542	501-503	572-576	562-565	574-576	551-552	559	6
5	468-472	528-530	533-542	-	-	497-500	571	560-561	573	549-550	556-558	5
4	464-467	510-527	518-532	484-488	514-528	490-496	565-570	554-559	568-572	-	554-555	4
3	459-463	489-509	506-517	472-483	511-513	483-489	561-564	-	-	541-548	551-553	3
2	457-458	469-488	486-505	467-471	494-510	478-482	556-560	-	564-567	537-540	-	2
1	347-456	341-468	363-485	345-466	360-493	369-477	458-555	460-553	458-563	421-536	434-550	1

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AGE 16

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	741-816	773-822	809-832	776-841	830	750-826	740-808	773-795	739-807	709-812	761-809	99
98	726-740	757-772	768-808	754-775	782-829	727-749	727-739	765-772	727-738	699-708	721-760	98
97	717-725	745-756	-	753	766-781	712-726	716-726	742-764	-	693-698	707-720	97
96	702-716	736-744	-	745-752	755-765	706-711	707-715	715-741	713-726	691-692	696-706	96
95	697-701	732-735	748-767	733-744	745-754	693-705	705-706	706-714	708-712	685-690	695	95
94	688-696	728-731	742-747	728-732	724-744	683-692	691-704	696-705	705-707	683-684	691-694	94
93	686-687	721-727	734-741	727	720-723	679-682	685-690	685-695	700-704	-	687-690	93
92	682-685	-	-	722-726	715-719	675-678	-	675-684	693-699	677-682	683-686	92
91	680-681	714-720	-	721	714	673-674	-	674	690-692	676	680-682	91
90	676-679	-	-	716-720	711-713	671-672	682-684	669-673	686-689	-	678-679	90
89	673-675	708-713	728-733	711-715	710	669-670	681	668	-	672-675	676-677	89
88	667-672	-	-	703-710	707-709	667-668	680	663-667	684-685	669-671	672-675	88
87	665-666	-	722-727	702	705-706	665-666	679	-	-	666-668	669-671	87
86	662-664	704-707	720-721	698-701	702-704	-	674-678	662	679-683	664-665	667-668	86
85	659-661	703	717-719	-	701	663-664	-	-	673-678	662-663	662-666	85
84	655-658	702	714-716	694-697	697-700	658-662	-	657-661	-	661	657-661	84
83	653-654	697-701	713	688-693	696	655-657	673	-	-	657-660	-	83
82	652	695-696	710-712	686-687	695	653-654	667-672	656	671-672	656	656	82
81	651	692-694	704-709	684-685	689-694	-	666	-	667-670	654-655	653-655	81
80	649-650	687-691	-	679-683	-	651-652	662-665	-	665-666	653	-	80
79	646-648	-	-	-	688	648-650	661	653-655	664	650-652	-	79
78	643-645	-	700-703	678	686-687	645-647	-	651-652	663	647-649	652	78
77	-	683-686	-	675-677	684-685	-	-	-	-	644-646	651	77
76	640-642	-	698-699	674	683	642-644	658-660	649-650	-	641-643	647-650	76
75	639	-	696-697	671-673	-	-	656-657	646-648	-	640	646	75
74	636-638	678-682	-	667-670	-	641	655	-	662	-	643-645	74
73	635	-	695	664-666	680-682	640	653-654	642-645	-	639	-	73
72	634	677	692-694	663	677-679	638-639	-	641	658-661	637-638	-	72
71	632-633	-	691	661-662	674-676	-	650-652	640	-	-	641-642	71
70	631	676	688-690	658-660	673	637	-	-	-	-	640	70
69	628-630	673-675	-	656-657	672	635-636	-	-	657	-	639	69
68	627	672	-	653-655	670-671	-	-	635-639	-	634-636	637-638	68
67	625-626	669-671	687	650-652	668-669	634	-	-	655-656	-	634-636	67
66	623-624	-	685-686	646-649	-	632-633	647-649	634	-	633	-	66
65	622	668	-	645	665-667	629-631	-	633	651-654	631-632	633	65
64	620-621	667	684	641-644	662-664	628	645-646	630-632	-	-	-	64
63	617-619	664-666	683	640	659-661	626-627	644	-	649-650	630	631-632	63
62	-	663	681-682	638-639	-	625	-	629	647-648	-	629-630	62
61	614-616	-	-	-	-	-	-	628	-	-	628	61
60	-	662	679-680	637	656-658	623-624	639-643	626-627	-	626-629	-	60
59	611-613	660-661	-	634-636	-	622	-	625	645-646	-	627	59
58	609-610	659	675-678	631-633	-	621	638	624	642-644	-	626	58
57	608	657-658	-	629-630	-	619-620	-	-	641	624-625	624-625	57
56	606-607	655-656	674	627-628	653-655	618	-	622-623	640	-	-	56
55	605	653-654	-	626	651-652	-	636-637	621	637-639	-	620-623	55
54	-	-	672-673	623-625	-	616-617	-	620	-	623	-	54
53	602-604	651-652	670-671	622	-	615	-	619	636	621-622	617-619	53
52	599-601	-	669	618-621	649-650	-	633-635	617-618	632-635	620	-	52
51	598	649-650	668	616-617	646-648	614	-	-	-	619	615-616	51
50	596-597	648	665-667	612-615	643-645	611-613	-	-	631	617-618	-	50

AGE 16

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	645-647	664	610-611	-	-	632	615-616	-	616	614	49
48	593-596	644	-	609	641-642	609-610	-	-	628-630	614-615	612-613	48
47	-	-	663	606-608	639-640	-	-	614	-	-	611	47
46	590-592	643	-	602-605	637-638	608	630-631	-	626-627	613	607-610	46
45	-	-	660-662	-	-	-	-	613	-	611-612	-	45
44	589	640-642	659	601	635-636	605-607	629	612	624-625	610	-	44
43	587-588	639	656-658	598-600	631-634	604	-	611	623	607-609	-	43
42	584-586	637-638	-	597	626-630	603	-	610	-	606	604-606	42
41	-	635-636	654-655	593-596	625	-	626-628	609	622	-	602-603	41
40	581-583	634	653	588-592	624	598-602	625	608	620-621	604-605	601	40
39	579-580	-	651-652	587	623	596-597	623-624	607	618-619	-	598-600	39
38	578	-	648-650	583-586	622	-	-	606	617	-	596-597	38
37	-	633	647	582	621	595	622	-	-	601-603	595	37
36	576-577	-	643-646	579-581	620	593-594	-	604-605	613-616	-	-	36
35	571-575	630-632	642	577-578	619	590-592	619-621	-	612	-	594	35
34	-	-	641	575-576	615-618	588-589	616-618	603	-	599-600	591-593	34
33	568-570	629	639-640	573-574	-	587	-	602	-	-	-	33
32	-	628	638	569-572	611-614	583-586	-	601	-	598	588-590	32
31	565-567	624-627	636-637	-	-	581-582	-	599-600	611	594-597	-	31
30	-	623	635	566-568	610	579-580	-	598	608-610	592-593	587	30
29	-	-	632-634	565	607-609	575-578	615	596-597	606-607	591	586	29
28	562-564	620-622	629-631	561-564	605-606	570-574	610-614	-	604-605	-	585	28
27	-	619	628	-	603-604	569	-	-	601-603	-	584	27
26	-	616-618	625-627	560	600-602	566-568	-	593-595	600	590	-	26
25	561	614-615	624	556-559	598-599	562-565	604-609	-	-	588-589	-	25
24	558-560	610-613	622-623	552-555	596-597	559-561	-	-	-	-	583	24
23	-	-	620-621	549-551	-	556-558	-	-	596-599	-	582	23
22	557	609	619	544-548	-	552-555	-	591-592	-	585-587	581	22
21	555-556	605-608	617-618	542-543	593-595	548-551	599-603	-	595	584	-	21
20	553-554	604	614-616	539-541	589-592	-	-	-	591-594	-	-	20
19	551-552	603	612-613	535-538	-	544-547	-	587-590	589-590	-	578-580	19
18	549-550	600-602	606-611	534	586-588	-	-	586	-	577-583	-	18
17	546-548	599	603-605	-	583-585	541-543	-	585	587-588	575-576	-	17
16	545	595-598	600-602	529-533	-	537-540	593-598	-	585-586	574	-	16
15	541-544	585-594	595-599	526-528	578-582	534-536	-	582-584	584	-	574-577	15
14	537-540	580-584	594	523-525	576-577	-	-	581	-	573	-	14
13	534-536	572-579	590-593	-	563-575	530-533	588-592	-	-	572	-	13
12	532-533	569-571	587-589	519-522	562	-	-	577-580	-	570-571	-	12
11	527-531	565-568	583-586	518	-	526-529	-	-	580-583	-	571-573	11
10	515-526	564	582	-	556-561	-	586-587	-	574-579	-	-	10
9	509-514	559-563	571-581	513-517	552-555	523-525	583-585	-	573	567-569	570	9
8	502-508	549-558	569-570	507-512	551	519-522	577-582	571-576	-	564-566	568-569	8
7	494-501	542-548	563-568	501-506	545-550	515-518	572-576	567-570	569-572	-	-	7
6	490-493	534-541	555-562	495-500	539-544	504-514	567-571	566	562-568	560-563	-	6
5	482-489	529-533	553-554	490-494	536-538	501-503	-	-	-	557-559	563-567	5
4	477-481	520-528	542-552	489	527-535	496-500	-	560-565	-	553-556	558-562	4
3	468-476	514-519	529-541	481-488	522-526	493-495	561-566	555-559	-	-	556-557	3
2	458-467	509-513	506-528	469-480	511-521	482-492	552-560	554	557-561	539-552	554-555	2
1	347-457	341-508	363-505	345-468	360-510	369-481	458-551	460-553	458-556	421-538	434-553	1

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AGE 17

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	736-816	798-822	830-832	792-841	830	731-826	729-808	771-795	727-807	705-812	746-809	99
98	707-735	770-797	784-829	764-791	809-829	710-730	716-728	715-770	726	702-704	718-745	98
97	697-706	757-769	768-783	-	747-808	703-709	-	708-714	716-725	698-701	710-717	97
96	688-696	745-756	-	754-763	739-746	694-702	707-715	704-707	710-715	691-697	701-709	96
95	684-687	743-744	-	739-753	732-738	690-693	704-706	695-703	708-709	683-690	694-700	95
94	678-683	728-742	757-767	733-738	731	686-689	699-703	688-694	703-707	-	687-693	94
93	675-677	-	754-756	-	724-730	683-685	698	683-687	700-702	681-682	683-686	93
92	674	-	748-753	727-732	721-723	679-682	692-697	681-682	-	675-680	679-682	92
91	670-673	721-727	741-747	721-726	717-720	676-678	688-691	675-680	693-699	672-674	-	91
90	-	714-720	-	716-720	714-716	673-675	685-687	674	-	670-671	676-678	90
89	667-669	-	736-740	713-715	710-713	671-672	682-684	-	-	666-669	-	89
88	665-666	-	734-735	711-712	709	670	681	669-673	-	-	672-675	88
87	661-664	708-713	728-733	706-710	706-708	668-669	-	668	686-692	663-665	-	87
86	659-660	-	727	702-705	701-705	667	-	-	-	662	-	86
85	658	703-707	722-726	698-701	697-700	-	680	663-667	684-685	-	669-671	85
84	657	-	-	694-697	696	665-666	679	662	680-683	661	665-668	84
83	655-656	-	717-721	693	-	-	-	657-661	677-679	659-660	662-664	83
82	653-654	700-702	716	688-692	-	662-664	674-678	-	674-676	657-658	660-661	82
81	652	697-699	713-715	684-687	693-695	659-661	673	656	673	655-656	659	81
80	-	692-696	708-712	683	692	-	-	-	-	653-654	657-658	80
79	650-651	-	-	679-682	691	656-658	668-672	652-655	-	-	656	79
78	649	-	-	-	689-690	655	667	651	670-672	650-652	653-655	78
77	646-648	687-691	704-707	678	687-688	653-654	-	-	668-669	649	651-652	77
76	-	-	-	675-677	686	651-652	666	-	667	647-648	650	76
75	644-645	-	-	-	683-685	650	-	646-650	666	-	649	75
74	643	-	700-703	674	682	648-649	662-665	-	664-665	646	647-648	74
73	641-642	686	699	671-673	680-681	-	661	645	663	-	-	73
72	640	683-685	698	670	-	-	-	-	-	644-645	-	72
71	-	-	696-697	668-669	677-679	647	659-660	641-644	661-662	643	646	71
70	636-639	681-682	-	666-667	676	645-646	656-658	-	658-660	641-642	643-645	70
69	-	678-680	695	664-665	673-675	-	-	640	-	638-640	-	69
68	635	676-677	693-694	663	672	642-644	655	-	657	637	-	68
67	634	-	692	662	669-671	641	654	-	-	-	-	67
66	633	-	691	658-661	668	639-640	653	-	-	-	641-642	66
65	631-632	673-675	688-690	657	-	638	-	-	655-656	636	640	65
64	630	-	-	654-656	664-667	637	-	637-639	-	634-635	639	64
63	628-629	672	687	653	663	636	-	635-636	653-654	-	637-638	63
62	626-627	-	685-686	651-652	661-662	635	-	-	651-652	-	-	62
61	625	869-671	683-684	650	660	633-634	650-652	-	-	-	636	61
60	623-624	667-668	681-682	648-649	659	632	-	634	650	633	634-635	60
59	-	-	-	646-647	-	631	-	633	-	632	631-633	59
58	621-622	664-666	679-680	645	657-658	630	647-649	630-632	-	631	-	58
57	620	-	-	643-644	656	629	646	-	649	-	630	57
56	618-619	663	677-678	641-642	-	628	645	628-629	648	-	628-629	56
55	617	662	675-676	640	653-655	626-627	644	626-627	647	630	627	55
54	-	660-661	674	636-639	-	625	-	-	-	-	-	54
53	615-616	658-659	673	635	651-652	623-624	641-643	625	646	629	626	53
52	614	-	672	634	-	622	639-640	624	-	627-628	624-625	52
51	612-613	656-657	670-671	632-633	-	621	638	622-623	643-645	626	622-623	51
50	611	655	669	627-631	646-650	620	-	621	642	-	621	50

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AGE 17

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	-	653-654	-	625-626	-	618-619	636-637	620	-	624-625	620	49
48	609-610	-	668	623-624	645	617	-	619	640-641	623	618-619	48
47	608	652	-	621-622	643-644	615-616	635	-	-	620-622	-	47
46	604-607	651	665-667	620	-	-	633-634	-	639	618-619	617	46
45	602-603	649-650	-	618-619	641-642	-	631-632	617-618	638	617	-	45
44	599-601	-	664	615-617	639-640	613-614	630	-	637	614-616	-	44
43	-	646-648	[illegible]	613-614	637-638	612	-	-	636	-	-	43
42	596-598	644-645	661-663	611-612	-	611	629	614-616	634-635	612-613	614-616	42
41	-	-	660	608-610	-	609-610	-	613	631-633	611	-	41
40	593-595	643	658-659	606-607	636	608	627-628	-	-	610	612-613	40
39	-	642	656-657	603-605	632-635	605-607	626	612	629-630	609	611	39
38	590-592	639-641	655	602	-	604	-	610-611	626-628	608	609-610	38
37	587-589	-	654	601	631	-	624-625	609	624-625	607	607-608	37
36	584-586	-	653	598-600	628-630	-	-	-	-	606	605-606	36
35	582-583	637-638	651-652	595-597	625-627	603	623	-	623	603-605	604	35
34	581	635-636	-	591-594	624	601-602	-	-	622	-	-	34
33	578-580	634	649-650	590	622-623	600	622	607-608	-	-	-	33
32	577	-	648	587-589	621	598-599	620-621	606	619-621	602	601-603	32
31	574-576	633	646-647	586	-	596-597	617-619	-	618	601	600	31
30	-	631-632	643-645	-	620	-	616	-	-	600	-	30
29	569-573	630	642	583-585	619	593-595	-	604-605	617	598-599	598-599	29
28	566-568	629	640-641	579-582	615-618	589-592	-	-	613-616	-	-	28
27	565	625-628	-	577-578	-	587-588	614-615	603	612	-	597	27
26	-	-	639	574-576	611-614	585-586	610-613	601-602	-	594-597	594-596	26
25	562-564	623-624	636-638	573	-	583-584	-	599-600	611	-	-	25
24	-	-	635	569-572	607-610	582	-	596-598	606-610	592-593	591-593	24
23	561	616-622	-	567-568	605-606	579-581	-	-	-	591	-	23
22	558-560	614-615	633-634	565-566	603-604	577-578	604-609	593-595	-	590	-	22
21	556-557	-	628-632	561-564	-	575-576	-	-	-	588-589	-	21
20	555	609-613	626-627	557-560	600-602	572-574	-	-	603-605	587	-	20
19	553-554	-	624-625	552-556	596-599	570-571	-	-	601-602	585-586	588-590	19
18	-	605-608	622-623	550-551	-	569	600-603	-	599-600	-	587	18
17	549-552	604	620-621	547-549	590-595	566-568	599	591-592	595-598	584	585-586	17
16	548	599-603	617-619	544-546	589	562-565	597-598	587-590	-	581-583	584	16
15	545-547	595-598	-	540-543	583-588	558-561	593-596	-	590-594	-	-	15
14	541-544	590-594	613-616	534-539	577-582	551-557	-	-	589	575-580	582-583	14
13	537-540	584-589	609-612	533	575-576	548-550	-	583-586	585-588	574	579-581	13
12	534-536	575-583	606-608	528-532	570-574	543-547	588-592	582	584	572-573	578	12
11	529-533	574	602-605	525-527	566-569	539-542	584-587	-	-	570-571	574-577	11
10	526-528	569-573	594-601	519-524	562-565	536-538	583	580-581	-	569	-	10
9	520-525	564-568	588-593	507-518	560-561	534-535	-	577-579	578-583	567-568	571-573	9
8	506-519	548-563	587	-	552-559	530-533	577-582	-	573-577	-	568-570	8
7	497-505	543-547	580-586	501-506	543-551	525-529	-	571-576	568-572	565-566	565-567	7
6	485-496	538-542	575-579	496-500	-	514-524	572-576	570	-	560-564	-	6
5	477-484	525-537	557-574	489-495	533-542	512-513	-	566-569	562-567	553-559	561-564	5
4	473-476	509-524	555-556	478-488	523-532	504-511	569-571	561-565	-	-	-	4
3	466-472	499-508	552-554	472-477	522	497-503	567-568	560	560-561	547-552	-	3
2	464-465	482-498	539-551	466-471	494-521	492-496	561-566	554-559	550-559	541-546	555-560	2
1	347-463	341-481	363-538	345-465	360-493	369-491	458-560	460-553	458-549	421-540	434-554	1

AGE 18

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	713-816	737-822	768-832	747-841	807-830	718-826	740-808	733-795	739-807	696-812	717-809	99
98	697-712	734-736	757-767	739-746	772-806	701-717	709-739	698-732	727-738	691-695	705-716	98
97	692-696	728-733	748-756	727-738	727-771	687-700	698-708	696-697	-	688-690	701-704	97
96	688-691	-	-	722-726	719-726	683-686	693-697	686-695	716-726	679-687	691-700	96
95	681-687	721-727	741-747	711-721	717-718	677-682	692	682-685	711-715	670-678	688-690	95
94	674-680	-	-	707-710	714-716	675-676	682-691	681	708-710	667-669	677-687	94
93	670-673	714-720	734-740	706	711-713	672-674	681	-	698-707	666	672-676	93
92	667-669	-	-	699-705	-	670-671	679-680	677-680	693-697	661-665	-	92
91	665-666	-	728-733	694-698	710	665-669	673-678	675-676	-	659-660	665-671	91
90	659-664	708-713	-	693	705-709	662-664	672	664-674	684-692	656-658	-	90
89	658	707	722-727	-	702-704	659-661	667-671	663	680-683	-	662-664	89
88	655-657	703-706	-	688-692	697-701	656-658	-	662	679	653-655	659-661	88
87	653-654	-	719-721	-	696	654-655	666	657-661	677-678	650-652	657-658	87
86	649-652	702	717-718	683-687	695	652-653	664-665	-	674-676	-	654-656	86
85	646-648	701	-	679-682	693-694	651	661-663	656	673	648-649	653	85
84	644-645	697-700	713-716	674-678	692	650	-	654-655	-	-	650-652	84
83	643	-	-	672-673	689-691	648-649	-	651-653	672	647	649	83
82	642	692-696	709-712	670-671	688	-	-	-	668-671	644-646	647-648	82
81	640-641	-	704-708	668-669	686-687	646-647	659-660	649-650	666-667	-	645-646	81
80	639	691	-	667	-	645	656-658	647-648	663-665	-	644	80
79	637-638	687-690	701-703	666	684-685	-	655	646	658-662	643	643	79
78	635-636	-	700	664-665	683	642-644	-	-	-	641-642	641-642	78
77	634	683-686	698-699	-	680-682	641	653-654	644-645	-	640	640	77
76	633	-	696-697	662-663	678-679	638-640	-	642-643	657	-	-	76
75	630-632	-	-	-	675-677	-	-	641	-	637-639	637-639	75
74	629	680-682	693-695	659-661	-	637	650-652	640	-	-	636	74
73	-	678-679	-	-	672-674	635-636	-	-	655-656	634-636	635	73
72	627-628	-	692	656-658	671	-	-	-	653-654	-	634	72
71	623-626	676-677	-	654-655	670	-	-	637-639	651-652	-	-	71
70	-	673-675	688-691	652-653	668-669	634	-	-	650	633	-	70
69	621-622	-	-	651	-	633	647-649	635-636	-	632	-	69
68	620	672	685-687	650	-	632	646	-	648-649	631	-	68
67	617-619	670-671	-	648-649	666-667	-	-	634	647	630	633	67
66	616	668-669	683-684	646-647	665	631	-	633	646	627-629	631-632	66
65	614-615	667	681-682	642-645	664	630	644-645	632	-	-	630	65
64	-	665-666	-	641	663	-	-	-	643-645	-	628-629	64
63	-	664	679-680	639-640	662	629	-	630-631	641-642	624-626	627	63
62	-	663	-	635-638	-	628	-	-	640	623	626	62
61	611-613	-	677-678	633-634	660-661	627	-	628-629	-	-	-	61
60	609-610	662	675-676	631-632	659	626	643	626-627	-	-	624-625	60
59	608	660-661	-	629-630	-	625	639-642	-	637-639	620-622	-	59
58	-	658-659	-	626-628	656-658	623-624	-	625	-	619	623	58
57	605-607	656-657	672-374	622-625	655	622	-	-	638	617-618	-	57
56	-	653-655	670-671	618-621	653-654	621	638	624	634-635	-	-	56
55	602-604	-	669	616-617	-	-	-	622-623	633	616	620-622	55
54	-	651-652	668	614-615	651-652	619-620	-	620-621	632	-	-	54
53	-	650	-	613	-	618	636-637	-	-	614-615	618-619	53
52	599-601	649	665-667	610-612	-	616-617	635	619	631	-	-	52
51	-	648	664	609	649-650	615	-	-	-	613	617	51
50	596-598	-	-	608	646-648	614	633-634	-	-	-	615-616	50

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AGE 18

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	595	645-647	661-663	607	643-645	612-613	632	617-618	-	612	-	49
48	593-594	644	660	605-606	-	-	-	-	628-630	611	-	48
47	590-592	-	-	602-604	642	611	630-631	-	-	610	614	47
46	587-589	643	656-659	601	641	-	-	615-616	627	609	613	46
45	-	640-642	-	598-600	-	609-610	629	614	-	-	611-612	45
44	586	-	655	-	640	608	628	613	626	607-608	610	44
43	584-585	639	-	597	637-639	607	626-627	-	624-625	-	607-609	43
42	-	-	654	-	-	604-606	-	-	623	605-606	-	42
41	581-583	-	653	595-596	-	-	625	611-612	-	-	604-606	41
40	-	637-638	651-652	-	636	601-603	623-624	610	-	604	603	40
39	-	636	649-650	592-594	635	-	622	-	621-622	603	602	39
38	578-580	635	648	591	631-634	598-600	-	609	618-620	602	601	38
37	575-577	633-634	-	587-590	630	-	-	607-608	-	601	600	37
36	574	630-632	646-647	583-586	628-629	-	620-621	-	-	-	598-599	36
35	-	-	643-645	582	625-627	597	-	606	-	599-600	597	35
34	571-573	629	-	581	-	595-596	616-619	-	617	-	595-596	34
33	-	625-628	-	579-580	621-624	593-594	-	604-605	615-616	598	-	33
32	-	624	640-642	-	-	-	-	-	-	-	594	32
31	569-570	623	639	577-578	-	589-592	-	-	-	-	-	31
30	568	620-622	-	573-576	620	588	-	603	612-614	595-597	-	30
29	-	-	636-638	-	618-619	585-587	615	601-602	-	594	593	29
28	565-567	616-619	-	569-572	615-617	583-584	614	-	610-611	-	591-592	28
27	-	-	635	567-568	-	582	610-613	-	608-609	592-593	-	27
26	-	614-615	634	565-566	-	576-581	-	599-600	606-607	-	590	26
25	562-564	611-613	632-633	-	611-614	570-575	-	598	-	589-591	588-589	25
24	559-561	609-610	629-631	562-564	610	569	-	-	-	587-588	586-587	24
23	558	605-608	626-628	561	606-609	566-568	-	-	602-605	585-586	585	23
22	557	-	620-625	556-560	604-605	564-565	609	596-597	601	584	584	22
21	555-556	604	-	553-555	603	562-563	604-608	-	600	-	-	21
20	553-554	603	617-619	550-552	-	559-561	-	593-595	595-599	582-583	583	20
19	551-552	600-602	610	547-549	601-602	555-558	599-603	-	-	581	582	19
18	547-550	595-599	613-615	544-546	599-600	551-554	-	-	-	-	581	18
17	545-546	593-594	610-612	541-543	596-598	548-550	-	587-592	594	-	578-580	17
16	-	587-592	609	539-540	-	544-547	-	-	591-593	580	-	16
15	542-544	585-586	606-608	534-538	-	541-543	-	-	589-590	577-579	-	15
14	541	584	603-605	533	591-595	-	595-598	586	-	-	575-577	14
13	-	577-583	600-602	530-532	589-590	534-540	593-594	585	-	574-576	574	13
12	537-540	575-576	597-599	526-529	587-588	-	-	582-584	584-588	573	-	12
11	-	569-574	591-596	523-525	583-586	530-533	588-592	-	-	570-572	572-573	11
10	528-536	565-568	586-590	516-522	573-582	526-529	-	-	-	567-569	571	10
9	518-527	563-564	583-585	507-515	561-572	524-525	-	580-581	581-583	564-566	568-570	9
8	501-517	550-562	578-582	505-506	556-560	523	-	579	578-580	561-563	566-567	8
7	498-500	543-549	569-577	501-504	549-555	519-522	583-587	577-578	574-577	560	565	7
6	497	534-542	563-568	496-500	536-548	512-518	577-582	575-576	573	558-559	561-564	6
5	490-496	522-533	551-562	486-495	529-535	508-511	573-576	571-574	-	557	559-560	5
4	-	509-521	536-550	478-485	523-528	500-507	572	569-570	-	553-556	556-558	4
3	483-489	495-508	531-535	-	517-522	490-499	567-571	566-568	569-572	549-552	554-555	3
2	465-482	478-494	514-530	466-477	507-516	486-489	554-566	560-565	557-568	548	548-553	2
1	347-464	341-477	363-513	345-465	360-506	369-485	458-553	460-559	458-556	421-547	434-547	1

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AGES 19 & 20

Stanford Achievement Test, 8th Edition, norms for hearing impaired students

Severe-profound hearing loss only

	Normed for all levels						Normed for Primary 3 - Advanced 2 only					
	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
99	684-816	745-822	784-832	754-841	731-830	690-826	701-808	704-795				99
98	675-683	728-744	766-783	733-753	722-730	679-689	688-700	680-703				98
97	667-674	-	748-765	727-732	716-721	665-678	685-687	672-679				97
96	662-666	-	741-747	713-726	711-715	663-664	681-684	666-671				96
95	659-661	723-727	736-740	707-712	707-710	662	-	656-665				95
94	658	721-722	734-735	702-706	705-706	657-661	680	655				94
93	654-657	714-720	728-733	700-701	701-704	656	679	652-654				93
92	649-653	708-713	722-727	696-699	-	-	672-678	649-651				92
91	-	-	717-721	691-694	-	653-655	667-671	-	I	I	I	91
90	648	-	-	688-690	-	652	-	-				90
89	645-647	703-707	713-716	680-687	700	651	-	647-648	N	N	N	89
88	643-644	698-702	709-712	679	697-699	650	666	646				88
87	641-642	697	708	678	696	648-649	661-665	-	S	S	S	87
86	639-640	692-696	-	675-677	692-695	645-647	-	645				86
85	638	-	704-707	674	688-691	-	-	-	U	U	U	85
84	636-637	687-691	701-703	-	687	644	-	-				84
83	634-635	684-686	700	670-673	685-686	642-643	659-660	-	F	F	F	83
82	632-633	683	-	668-669	684	640-641	656-658	643-644				82
81	631	-	696-699	664-667	683	639	-	641-642	F	F	F	81
80	630	-	-	662-663	680-682	638	-	-				80
79	628-629	-	694-695	-	679	635-637	654-655	640	I	I	I	79
78	627	678-682	688-693	659-661	677-678	-	653	-				78
77	626	-	-	655-658	-	-	-	635-639	C	C	C	77
76	625	676-677	-	652-654	676	634	-	634				76
75	624	-	-	649-651	675	633	652	633	I	I	I	75
74	621-623	673-675	-	648	-	632	650-651	-				74
73	-	-	687	645-647	673-674	630-631	647-649	632	E	E	E	73
72	620	-	684-686	642-644	-	-	-	630-631				72
71	617-619	672	681-683	641	672	627-629	644-646	-	N	N	N	71
70	614-616	-	679-680	638-640	-	626	-	629				70
69	-	669-671	678	637	668-671	624-625	-	628	T	T	T	69
68	612-613	-	677	633-636	-	623	641-643	626-627				68
67	611	667-668	-	631-632	665-667	-	-	625				67
66	609-610	665-666	675-676	630	663-664	621-622	639-640	-				66
65	608	664	-	627-629	661-662	620	-	624	D	D	D	65
64	605-607	663	674	626	660	619	-	622-623				64
63	603-604	662	-	-	659	-	638	-	A	A	A	63
62	602	660-661	672-673	622-625	-	-	636-637	621				62
61	599-601	-	-	621	-	617-618	635	619-620	T	T	T	61
60	-	658-659	670-671	-	-	616	-	-				60
59	-	655-657	-	618-620	655-656	614-615	-	-	A	A	A	59
58	-	653-654	668-669	614-617	652-654	612-613	634	617-618				58
57	598	-	666-667	611-613	651	611	633	615-616				57
56	596-597	651-652	665	-	650	610	630-632	-				56
55	-	649-650	663-664	608-610	646-649	609	-	614				55
54	595	648	-	604-607	645	608	-	613				54
53	-	645-647	660-662	603	643-644	605-607	629	-				53
52	593-594	-	-	602	-	604	-	-				52
51	-	644	-	-	642	601-603	627-628	612				51
50	591-592	-	-	600-601	641	-	-	611				50

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	Reading Comp	Concepts of Number	Math Comp	Math App	Spelling	Lang	Lang Mech	Lang Exp	Study Skills	Science	Social Science	
H.I. Rank	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	H.I. Rank
49	590	-	-	598-599	640	600	626	-				49
48	-	640-643	658-659	594-597	637-639	597-599	624-625	610				48
47	587-589	639	656-657	592-593	-	595-596	-	609				47
46	584-586	637-638	-	591	-	593-594	622-623	608				46
45	581-583	635-636	655	588-590	635-636	-	620-621	607				45
44	-	634	653-654	586-587	632-634	590-592	616-619	-				44
43	-	-	-	-	-	589	-	606				43
42	579-580	-	652	581-585	631	588	-	605				42
41	578	633	651	-	627-630	585-587	-	604	I	I	I	41
40	577	629-632	649-650	579-580	625-626	-	-	601-603				40
39	575-576	-	646-648	577-578	-	583-584	613-615	-	N	N	N	39
38	574	-	643-645	573-576	623-624	580-582	-	-				38
37	-	628	-	572	621-622	579	610-612	-	S	S	S	37
36	569-573	625-627	642	569-571	-	576-578	-	599-600				36
35	568	-	-	568	620	575	-	598	U	U	U	35
34	-	623-624	640-641	567	-	572-574	-	596-597				34
33	567	620-622	-	565-566	616-619	-	-	595	F	F	F	33
32	565-566	-	639	562-564	615	569-571	-	593-594				32
31	564	619	637-638	561	611-614	566-568	604-609	591-592	F	F	F	31
30	562-563	616-618	635-636	558-560	610	-	-	589-590				30
29	-	615	-	556-557	-	564-565	-	587-588	I	I	I	29
28	558-561	610-614	631-634	-	608-609	562-563	-	-				28
27	557	-	630	555	603-607	559-561	-	585-586	C	C	C	27
26	-	-	629	550-554	-	-	-	582-584				26
25	554-556	605-609	628	544-549	599-602	555-558	-	-	I	I	I	25
24	553	604	627	543	596-598	553-554	599-603	-				24
23	552	603	-	539-542	589-595	551-552	-	-	E	E	E	23
22	549-551	-	624-626	538	587-588	549-550	594-598	-				22
21	-	600-602	617-623	534-537	583-586	548	593	-	N	N	N	21
20	547-548	598-599	616	533	-	547	-	-				20
19	545-546	596-597	613-615	530-532	581-582	544-546	588-592	580-581	T	T	T	19
18	541-544	590-595	609-612	528-529	577-580	542-543	-	-				18
17	-	-	-	525-527	-	541	-	577-579				17
16	-	585-589	608	523-524	576	538-540	-	-				16
15	-	580-584	604-607	-	571-575	534-537	-	575-576	D	D	D	15
14	537-540	575-579	597-603	519-522	566-570	530-533	-	574				14
13	529-536	570-574	593-596	513-518	563-565	526-529	-	571-573	A	A	A	13
12	527-528	569	590-592	507-512	562	-	583-587	-				12
11	517-526	564-568	586-589	-	-	523-525	580-582	-	T	T	T	11
10	502-516	560-563	583-585	501-506	555-561	515-522	577-579	-				10
9	498-501	554-559	577-582	-	552-554	-	-	568-570	A	A	A	9
8	493-497	553	569-576	496-500	546-551	512-514	575-576	566-567				8
7	485-492	548-552	566-568	491-495	540-545	504-511	572-574	-				7
6	484	539-547	562-565	484-490	536-539	498-503	-	560-565				6
5	481-483	537-538	555-561	478-483	529-535	494-497	568-571	548-559				5
4	477-480	531-536	539-554	474-477	523-528	490-493	567	-				4
3	473-476	503-530	533-538	472-473	511-522	482-489	560-566	-				3
2	464-472	480-502	520-532	456-471	503-510	480-481	549-559	525-547				2
1	347-463	341-479	363-519	345-455	360-502	369-479	458-548	460-524				1

Gallaudet University, in Washington, DC, is the world's only liberal arts university for deaf students. In addition to offering on-campus educational programs from the preschool to doctoral levels, Gallaudet is an internationally recognized center for research, program development, and consultation related to deafness and hearing loss. Gallaudet University is an equal opportunity employer/educational institution. Programs and services offered by Gallaudet receive substantial financial support from the U.S. Department of Education.

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